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ABSTRACT

This report by the Computer Utilization Group which was set up in 1960 by the Organization for Economic Cooperation and Development (OECD) consists of two parts: 1) a brief statement of conclusions, recommendations and suggestions for research by the data bank panel and a list of the panel members and 2) the background report prepared by Klaus Lenk, Consultant to OECD which makes up the majority of the report. Mr. Lenk discusses the present state of automation in government and explores the concepts of data banks and public administration. He analyzes some models of automation in public administration and summarizes recent developments in Sweden, Norway, Denmark, Belgium, and Germany. The organizational and economic conditions which facilitate success are also explored. A final section outlines some possible impacts of advanced automation on the structure and functions of public administration such as centralization and decentralization, power shifts, the quality of service and social consequences. (JG)

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part I - conclusions by the data bank panel

part II - automated information management in public administration - present developments and impact - by klaus lenk

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PREFACE

The Computer Utilisation Group, set up in 1968 by the OECD Committee for Science Policy in response to recommendations of the third Ministerial Meeting on Science, has on its programme studies in the fields of computerised data banks, interaction of computers and telecommunications, computer manpower education, computer utilisation surveys, efficiency audits for computer systems and the potential of information technology in urban and regional planning.

One of the programme items of this group during 1971 was the investigation of policy issues in the field of data bases in public administration.

The present report highlights policy issues created by the rapid development of governmental administrative information systems and consists of two parts:

I. The statement of conclusions adopted by the Data Bank Panel.

II. The background report prepared by Klaus Lenk, Consultant to OECD.

The views expressed in the consultant's report are those of the consultant alone and do not necessarily reflect those of the Panel members, their governments or the OECD Secretariat. The Panel conclusions on the other hand were developed by the Panel members whose names appear on the attached list and consequently do represent their collective opinion. However, they have not been co-ordinated formally with member governments and consequently should not be construed as constituting the official policies or opinions of those governments.

Part One

I. Statement of Concludions by the Data Bank Panel

II. List of Panel Members

I

STATEMENT OF CONCLUSIONS

Development of integrated data bases in public administration has been significantly slower than predicted almost a decade ago. It may by assumed that an inadequate conceptual framework, such as the notion of the "data bank", and lack of consideration of the specific features of the administrative environment into which information technology was introduced, contributed to this relatively slow development.

However, important new developments can be found in several European countries, where large integrated data bases for operative purposes of public administration are being gradually built up in ways compatible with a later comprehensive integration design.

The lack of empirical research on actual or possible positive as well as negative consequences calls for more policy research in this area. It is therefore suggested that information on integrated data base development be considerably improved in the future, both nationally and internationally.

The trust of such policy research should be to provide policy makers with adequate tools for assessing the desirability and ways of extending the application of information technology to government and for clarifying the main issues involved.

Policy research is a prerequisite for political mastery of technical progress in the field of information technology in public administration. It is recommended that

- Such research on integrated data base development should cover positive as well as negative social and administrative consequences. Ways and means have to be found to weigh gains in administrative efficiency and improved services against potential threats to the privacy of the individual, or other negative consequences.

If developments of integrated data bases are to be continued in a harmonious way so as to enhance the quality of public administration, it is recommended that

- Great emphasis be given to the overall system improvement of public administration rather than just to development of sophisticated data processing techniques making use of the newest technologies available;
- Systems analysis and systems knowledge be extended to the entire procedure of administrative operations, instead of confining them to the computerised elements;
- The greatest use be made of existing data exchange and cooperation patterns, and the quality of existing files to be computerised be checked and improved.

Economic evaluation is an important factor in developing integrated data bases. However, many benefits such as improved services to the citizen or better information flow in administrative units drawing on an integrated data base, are difficult to express in monetary terms. In some cases such benefits may not be obvious when a data base is being built up which is later on to serve as a basic register for the operations of a wide range of units or branches of public administration.

Economic evaluation should be a regular component of integrated data base development but should not be overstressed at the expense of other factors of importance.

Integrated data bases open up the possibility, for all branches of public administration, of obtaining a wide range of personal information on every citizen. Fears of negative social consequences may inhibit the development of such data bases. Decisions tending towards such inhibition may be more difficult to take when data base development is already fairly advanced, when important sums of money are spent for this purpose, and when this development has already led to an important positive impact on the quality of public administration.

It is recommended that

- Comprehensive studies be made prior to the introduction of new integrated data base systems on their consequences for the administrative process, for the individual and for society;
- These systems should present a high degree of flexibility and adaptability, both in the hardware and software aspects of the computer system and in the administrative processes using integrated data processing.

Information technology is changing the information environment on which decision-making processes are based. This is of special relevance to information flows in public administration. It is recommended that future work of OECD in this problem area be given special emphasis.

II

LIST OF MEMBERS OF THE DATA BANK PANEL WHO ATTENDED THE MEETING OF 17th AND 18th MAY, 1972

Chairman	Mr. P. Svenonius	Statskontoret, Stockholm (Sweden)
Belgium	Mr. B. Paris	Services du Premier ministre, Fonction publique, Bruxelles
	Mr. F. Poleunis	Services du Premier ministre, Politique scientifique, Bruxelles
Denmark	Mr. M.D. Rømer	Department of Administration, Copenhagen
France	Mr. O. Rateau	Délégation à l'Informatique, Paris
	Mr. P. Leclercq	Ministère de la Justice, Paris
Germany	Mr. Haneke	Gesellschaft für Mathematik und Datenverarbeitung, Bonn
	Mr. G.A. Kurtz	Bundesinnenministerium, Bonn
	Mr. H. Wille	Bundesministerium für Wirtschaft und Finanzen, Bonn
Ireland	Mr. S.P. Bedford	Office of the Revenue Commissioners, Dublin
	Mr. M. Cullinane	Central Data Processing Services, Department of Finance, Dublin

Luxembourg	Mr. G. Biwer	Ministère de la Fonction publique, Luxembourg
Netherlands	Mr. D. Ravestyn	Ministry of Internal Affair, The Hague
Norway	Mr. K. Selmer	University of Oslo, Oslo
United Kingdom	Mr. H.A.J. Marshall	Central Computer Agency, Civil Service Department, London
Yugoslavia	Mr. Han	University of Subotica, Subotica
SECRETARIAT	Mr. H.P. Gassmann	
	Mr. K. Lenk	

Part Two

AUTOMATED INFORMATION MANAGEMENT IN PUBLIC ADMINISTRATION

- Present Developments and Impact -

by

Klaus Lenk

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SUMMARY OF MAIN FINDINGS

The continuing disappointment with integrated data bases in public administration is due to a significantly slower development than predicted almost a decade ago. It may be assumed that the lack of consideration of specific features of the environment into which information technology is introduced, has contributed in large measure to this relatively slower development.

The concept of a "data bank" does not take into account the special features of public administration. It is preferable, therefore, to speak of integrated data bases when trying to characterise advanced automation. This prevents the introducing of assumptions of organisational structures which are incompatible with the way in which public administration works.

I. ORGANISATIONAL CONSTRAINTS AND CONDITIONS FOR SUCCESS

There is an apparent contradiction between complex models of generalised information systems and the existing piecemeal developments. However, relatively successful developments have been encountered in several European Member countries, especially in Sweden.

Generally, the main effort in these countries is directed towards computerised population registers, in some cases permitting random access to files. These registers are to serve in all reported cases as a basic information pool for all parts of public administration and, subject to provisos, the private sector. As a corollary, person identification numbers are being introduced generally.

With the exception of some car registration systems, integrated data base developments in particular branches of public administration (social services, tax, etc.) are generally less advanced than population registers. The same applies to the construction of two other basic registers, namely of real estate units and business firm units (or legal persons).

These first steps towards advanced automation in public administration are often sophisticated with regard to the analysis and design of overall organisational structures, but not in the sense of a very advanced use of the latest computer and communication technologies.

Several factors seem to be responsible for such a situation, but the relative importance of each cannot be established without further investigation :

a) Integrated data bases are inserted into the working procedure of public administration, and not regarded as something external to it. Systems analysis and design is not confined to the part of administrative work to be computerised but directed at the whole structure of public administration. The careful investigation of the way in which public administration functions is given much weight. In many cases, it is performed not by outside consultants but by administrators familiar with the specific problems of automation in public administration.

b) Good quality in the existing administrative organisation seems to be more important than data processing performance in a narrow sense. This good quality may be due to civil service traditions and the relationships of public administrations with the public. When a computerised data base is being created the existante of well-established data exchange or data sharing patterns is of particular importance. This may considerably facilitate the introduction of computerised procedures since it means changing fewer of the procedures and organisations.

c) The quality and reliability of existing manual files contribute greatly to the subsequent successful operation of a data base. This factor is being given more and more consideration.

d) Difficulties in defining the objects to which register data refer may be at the root of the slower development of basic real estate or business firm registers.

II. ECONOMIC IMPLICATIONS

Financial restrictions and the necessity to show tangible results have been found to be important in a few countries especially in Sweden. They may be an important factor of success in implementing integrated data bases. However, they present several problems, especially concerning the nature of benefits to be reaped and the general significance of economic rationality in public administration :

a) The main benefits expected from integrated data bases are cost savings, better service and better information for decision-makers. Except for cost avoidance these benefits cannot

generally be expressed in monetary terms. They are nothing more than the chief positive consequences of integrated data bases for public administration, seen from an economic point of view. It does not seem appropriate to treat them in the narrow context of cost/benefit analysis. Improved service or the value of information to branches of public administration can hardly be quantified, although in some cases they constitute the main incentive for the introduction of new technologies.

b) Therefore economic evaluation as well as the practice of charging branches of public administration for the work carried out by government service bureaux seem to be a necessary but still imperfect tool for measuring and increasing the efficiency, or rationality, of public administration.

c) Economic evaluations are procedures for evaluating alternatives with regard to one single aim making a profit and/or saving costs. They do not take other potential or actual aims into account. Public administration has many different aims; its complex goal structure does not enter into economic considerations.

d) Moreover, the benefits of integrated data bases may arise in very different places, often unknown when a system is being designed. As the integration potential of data bases is at present often hidden by the organisational structure of public administration, economic evaluation is frequently confined to single departments, and cannot therefore detect this potential.

e) The method often employed of evaluating in monetary terms and then listing the unquantifiable benefits becomes disproportionate when a wide range of unquantifiable, or often still unknown, factors is obviously more important than - frequently doubtful - savings in manpower costs.

f) However, economic evaluation should be given consideration within the political process of evaluating the desirability of introducing integrated data bases. They should be seen as one factor among others. It is even highly beneficial to base political options on financial considerations, provided this does not lead to hiding the underlying political responsibility for setting standards of work for public administration.

g) If the shortcomings of purely economic evaluations are kept in mind, short-term payoff considerations and financial constraints may lead to a step-by-step approach in developing integrated systems. As long as wider integration perspectives are present, this may be beneficial.

III. IMPACT ON PUBLIC ADMINISTRATION

As the development of integrated data bases in public administration is still in its first stages, it has not yet had many consequences for the structure and function of public administration. Empirical research in this field is lacking almost everywhere. However, continuing attention must be given to this subject, as in many European countries piecemeal development of large integrated data bases can be observed which could have an important impact in about ten years' time. Therefore, it does not seem to be too early to look for clarification of the major policy issues in this field.

Although not yet of great use for such a clarification, the following findings may show where future policy research is needed :

a) Some examples of <u>functional centralisation</u> have been encountered. This means the linkage or consolidation of working procedures which are being performed by separate parts of an organisation. Parts of such procedures are often rearranged and carried out centrally, without notable shifts in the responsibility for the final "product". Thus, the information storage functions of separate law enforcement agencies or separate agencies in charge of car registration, car taxation, etc. may be centralised.

b) Equally important is what may be called <u>centralisation of control</u> which means that the upper levels of authority may be in a better position to exercise control, if the work of subordinate units is automated and supported by integrated data bases.

c) Centralisation of control could be combined with <u>institutional decentralisation</u> of administrative units, as central authorities should be more willing to delegate powers of decision if the use of such power can be closely monitored.

d) Such an institutional decentralisation cannot yet be observed, but it may well be that the trend towards <u>institutional centralisation</u>, e.g., the closing of local offices, which accompanied the first phase of automation of administrative routine tasks, will be reversed.

e) Institutional decentralisation can contribute to improvement in the <u>quality of services</u> which public administration supplies. Some other improvements already encountered in the quality of services are shorter time spans in some cases, better information for the citizen on his rights and duties, and the avoidance of physical displacement.

f) It is practically impossible, at this early stage, to verify any impact on the institutional organisation of public administration. The "functionalisation" of the institutional structure of public administration so often predicted, has not yet occurred. Institutional borders may be crossed more often than before by data sharing, data exchange, or better coordination, but they continue to subsist.

g) There are some indications of centralisation involving shifts of power from local authorities to central government, mainly because of standardization of data processing procedures and economies of scale in integrated data base development at an upper level.

h) Functional centralisation brought about by integrated data bases and data exchange in public administration may lead to negative social consequences, as citizens' lives may in the long run become more transparent to public administration when each unit may obtain all information stored on any single individual. Such a situation has not yet been experienced, but the question calls for adequate regulation now. This problem may be described in terms of threats to the privacy of the individual, but in a public administration environment it has specific connotations which regulations must take into account.

Part One

AUTOMATION IN GOVERNMENT : CONCEPTS AND PROBLEMS OF INVESTIGATION

1.1. PRESENT SITUATION

The rising level of public awareness in many OECD Member countries of the undesirable side-effects of economic growth has led to considerable political constraint being put on governments (public administration) to assume major responsibilities in coping with these side-effects. However, in almost no Member countries have governments and their administrations succeeded in identifying and formulating, as early and as completely as desirable, the new problems that have emerged as side-effects of economic growth. One reason for this may be the rigidity and fragmentation of the bureaucratic structure of such administrations, where "functions already assumed became more important than aims" preventing agencies designed around these functions from being fully aware of emerging problems * .

In this situation more and more attention is given to science and technology. The hope is expressed that science and technology, especially the social sciences, can play an important role in improving management and organisation of public administration, thus enabling it to fulfil its new tasks. This is particularly true for information technology and its actual core component, the computer.

It is often anticipated that the implementation of large computerised information systems will be an important step in making public administration more aware of emerging problems :

- Information gathered by different agencies or governmental units dealing with different, although overlapping, sectors of society, might be made more easily available to long-range planning government institutions.

- Improved management of public administration could free administrators from routine decisions, giving them more time for important tasks.

* Science, Growth and Society (06), p. 60.

Note : Numbers in brackets refer to the Bibliography, at the end of this book.

- Reconsideration of organisational structures, made possible or even necessitated by new information supports, could permit the design of forms of organisation enabling administrators to take into account the side-effects and by-products of their decisions, thus enhancing their sensibility to social problems.

Information technology is often considered as a universal panacea applicable to all major political and administrative problems, as were other, previously developed technologies. Until very recently computer hardware and software vendors have often supported such a view, especially when the usefulness of computer technology could not be measured exactly in terms of money or manpower savings. For example, this view still seems to be partly alive in the United States, where considerable efforts are being undertaken to develop a nation-wide computerised network for the storage and transmission of law enforcement information, in order to cope with increasing crime rates *.

But, as a whole, this view of information technology as a panacea to major problems of government is in flagrant contradiction to the actual role of information technology, especially computers, in government and public administration. Practically nowhere in public administration are the pretentious concepts of Management Information Systems (MIS), Data Banks, Global Information Systems materialised. Even among strong supporters of the introduction of computers in the public sector it has become commonplace to state that "... our accomplishments in the effective application of computers have simply not kept pace with our progress in hardware and software technology" **.

The technical developments giving rise to the hope that computers may support or even take over many administrative or planning tasks, are not recalled here. Suffice it to say that "remote access computing has provided the prerequisite for easy and fast, or, if required, immediate, communication between the individual administrator and central and local data bases at the time when the administrator might need the communication" ***.

The technical possibilities available are far from being exhausted. Main computer applications in public administrations still concern large routine-type applications. Advanced automation with random access data bases as its key component to support routine decisions or more complex decision-making or planning tasks can be encountered only in a few places. The introduction of computers in public administration may still be described as simple "translation" of manual files and procedures to computerised files and procedures.

* These efforts culminate in the establishment of a National Crime Information centre of immediate access to State and local law enforcement agencies. For details see a series of articles in Datamation, Vol. 17, N° 12, 15th June, 1971, pp. 24 - 39.

** Auerbach (01), p. 247.

*** Rømer (DK05), p. 4.

This report tries to shed some light on the reasons for the fairly slow development towards advanced forms of automation, especially the implementation of data bases in public administration. It tries to identify some of the constraints which might be at the root of such a situation and will also try to discuss the desirability of getting faster implementation of integrated data bases and to assess whether there are already some tangible impacts of advanced automation on structure and function of public administration. In doing so, the report aims at providing elements for policy discussions weighting the pros and cons of advanced automation in public administration and asking whether it is at all desirable to continue introducing large data bases into public administration, and in what way this could eventually be done.

The reasons for the present slow development of advanced automation are not to be found in the available technologies but rather in the environment into which these technologies are being introduced, as well as in the concepts guiding that introduction. Rather than describing once more available technologies, this report will try to look closely at relevant features of that environment, namely public administration. In order to sketch an appropriate conceptual framework for doing this, some of the concepts guiding the introduction of computers in public administration will also be discussed briefly.

1.2. DIFFICULTIES OF INVESTIGATING THE STRUCTURE OF PUBLIC ADMINISTRATION

In putting the focus on the environment in which information technology shall reap benefits, this report has to face several problems.

The potential of computerised information systems is no doubt greater than the applications available which were designed under a series of constraints of different natures. However, when insisting on this potential without regard to the reality, the danger might arise of involuntarily supporting the universal panacea view of information technology which is currently being demystified. For this reason, the present report tries to identify some of the most advanced computer applications in public administration. Only in their light can the feasibility and desirability of large-scale information systems be investigated.

The outcome of this report will not be just another model of an "Integrated Information System", or the like. Such a model would have to respond in an optimum way to standards of democracy, separation and control of powers, data confidentiality and protection of privacy, equality of access to information, etc., as well as to criteria of technical and organisational efficiency. The design of such a model would require much research work which seems to have been done nowhere up to now and which is seriously hampered by the lack of relevant empirical studies on automation in public administration *.

* Cf. however Westin (AA02, AA03), and for investigation into a private business environment, Whisler (05).

It is urged that such studies be undertaken in a greater number than so far. The enormous amount of material gathered up to now is in most cases not of great value in assessing the administrative, social and political consequences of automation. Often this material consists of consultants' reports which constitue only blueprints for future implementation. If there is an implementation at all, it is often not documented. Moreover, the small amount of material of descriptive nature is often limited to technical aspects of the introduction of computers into a public administration environment.

Still other difficulties may be encountered in comparing progress in the automation of public administration in several countries. Not only do the tasks of public administration differ from country to country, but even the concept of public administration is not fully agreed upon. This concept has grown in those countries where monarchical regimes have built up centralised administrations (France, Sweden, Prussia, Austria). The concept of public administration is closely related to continental European conceptions of sovereignty and the "State" which have only fairly recently been introduced into the English-speaking world. For a long time, it was not usual, in English-speaking countries, to include the different education, health, law enforcement agencies under the concept of public administration. Even today, one might wonder if an American and a German really mean the same thing when talking about public administration. The contradiction between the civil society and the State (the "private" and the "public") and between administration and politics that still persists, at least in theory, in continental Europe, has hardly ever had the same meaning in the various English-speaking countries.

But even countries with basically the same tradition, such as France and Belgium, or Italy and Germany, cannot easily be compared. The repartition of administrative tasks on the different levels of government : local, regional (provincial/state) and national, varies considerably from one country to another. The position of local government may be weak or strong; basic data for administrative purposes may be collected at one level and then transferred to another; units of the same level may co-operate more or less among themselves or with the unit above. The necessity for a computerised real-estate data base may be felt in one country at a central government level, whereas in another it is felt at the local or regional government level.

Finally, the role of public administration may be conceived very differently in different countries. There may be countries where population registration has been in existence for a long time, so that very reliable files may be easily computerised without very much public concern about possible misuse. In other countries, the mere proposal to open such files may be felt as an invasion of personal privacy. The conflict between individual privacy and the necessity for giving enough data to the State (the welfare bureaucracy) to enable it to provide adequate welfare is presented in different terms in each country.

Such national differences have always to be borne in mind when the automation of public administration or privacy questions are discussed. They have already generated a number of misunderstandings in international discussions. The level of automation, both in quantity and quality, may vary considerably in countries which may be on the same level in economic and technological terms, but have different administrative structures.

Notwithstanding such important national characteristics, some general statements may, however, be made about public administration. In general, as is reflected in the heated discussions on privacy which are taking place in some countries, the public holds contradictory opinions on public administration.

Public administration is confronted with many, often new and contradictory demands. It has to work efficiently, but nobody wants to see it at work. The necessary resources for that work - taxes - are voted reluctantly.

It is commonplace to say that public administration is an information-handling (data processing) enterprise. Yet it must be stressed that information-handling is only a means to further goals and that the significance of information lies in the actions caused and controlled by it. Very roughly, three main functions of public administration may be identified :

- guarantee of law and order;
- co-ordination and steering of social and economic activities where market mechanisms fail to do so or political constraints call for such action ;
- delivery of services ; non-profit services in which private business takes no interest and services which for reasons of important social outcomes or sometimes for merely traditional reasons are not left to private business.

In many concrete administrative actions, these functions may overlap. Therefore, the goal structure of administrative actions is very complex and difficult to explore. One and the same action may be directed towards the attainment of different goals. This complicates considerably the analysis of administrative actions which is a prerequisite to successful automation.

1.3. THE DATA BANK CONCEPT

In order to successfully investigate the problems and the impact of automation in public administration some attention has to be paid to the concepts which have guided such efforts up to now. It is contended here that some of these concepts, besides being one of the causes of the apparent failure to introduce large systems successfully , complicate rather than clarify the underlying issues. This will be shown with regard to the current meaning of the concept "data bank"*. An alternative concept, namely "integrated data bases", will be used instead in order to characterise the main element of advanced automation.

There is some confusion about the concept of a data bank, which is not understood in the same way by everyone concerned. Especially in the Scandinavian countries, but in other European countries too, it is often not well understood in the sense which is developed in the following lines. In these countries, it may come very close to the concept of a "dynamic data base" ** or an "integrated data base" as elaborated below. However, in its most common acceptance the concept of the "data bank" relies on the following elements :

1. An organisational separation of a data-processing centre that provides for the storage of data on machine-readable support. A separate agency may be created to this purpose, or at least a certain organisational separation within an existing administrative unit is required.

2. The metaphor of a bank : data from different sources are brought together in one place and committed to the charge of an independent organisation by the collectors.

3. Such data are available to a wide variety of users.

4. The data organisation (as distinguished from the institutional organisation of the Data Bank) provides a series of arrangements of output, regardless of the special purpose for which the users require data. The data bank concept therefore, is very close to the idea of statistics behind the existing governmental statistical offices. Some authors even reserve the expression "data bank"

* The term "data bank", like "management information system", is now being almost completely abandoned in the United States where designs to implement data banks or complex management information systems have rarely proved feasible. The present disappointment with such complex systems is not confined to the public sector and it has even been asked whether such systems were designed to avoid their use, with the problems not clearly stated and success specifications not agreed upon; Grosch (10).

** This concept is used, for example, by Myron E. Weiner, Trends and Directions for Urban Information Systems, in Westin (07), pp. 336-356 (353), to designate data bases which are closely connected to administrative operations.

for a set of stored data specially designed for statistical or urban and regional planning purposes, as distinct from administrative routine operations and inquiry purposes *. Others distinguish between statistical, administrative and mixed data banks **.

The very concept of a data bank is thus fairly heavily loaded with assumptions as to its organisation and use. Such a concept does not seem very appropriate for the understanding of automation in public administration and its impact. "Data banks" in public administration may be of two fundamentally different kinds :

- The establishment of a data bank may in itself be a service which the State renders to society, as, for example, data banks for technical and scientific information.

- On the other hand, data banks may be instrumental in helping public administration fulfil its tasks, that is, render other services, etc.

It is only the second kind that is considered when the impact of automation on structure and function of public administration is to be assessed. The wide variety of possible forms of computerised data storage in public administration cannot be narrowed down to the data bank concept. This concept has been created by systems analysts or information technology specialists, without regard to the special structure of each particular environment in which it was intended to be workable. It is not an interdisciplinary concept:

The organisational separation artificially isolates the data-processing part from the remainder of public administration, which in this context must be seen as a global socio-technical information handling system. This separation prevents the recognition of necessary or desirable organisational changes in the information system "public administration" that may be required or made possible by information computer and telecommunication technology.

The idea of availability of the data bank to a wide variety of "users" does not correspond to the actual situation, at least in those countries where public administration is seen as a global entity (the State). The different branches of administration have clearly defined data needs, as far as routine decisions are concerned. These may partly be fulfilled by data stored in machine-readable form. It does not seem very appropriate to call these branches "users" of data stored to make their

* See, for example, William Mitchell (US02).

** Svein Nordbotten quoted in Bachi and Baron (12), pp. 49 ff. Cf. also Westin (07), pp. 15ff identifying five different types of data banks.

day-to-day work possible. The concept of "user" is linked to data banks for statistical purposes or data banks where inquiries coming from the public-at-large are possible.

The idea of organisational separation and of a variety of users neglects the fact that computerised data files may be part of one or more administrative processes where routine decisions with well-defined data needs are taken. If such decisions are partly or entirely programmable, decision-making may be partly or entirely automated. Thus a population file may be the base for income tax assessment, welfare delivery or listing of the population by age or occupation (school children , conscripts, electoral registration lists). Such routine tasks are at present much more within the focus of automation in public administration than the use of the data for purposes of planning or statistics.

The converging of data from different sources renders only insufficiently the idea of data needs that are common to several administrative processes, of data that may be shared by administrative units in order to perform such processes, and finally of combining such data in new meaningful ways for planning or statistical purposes. These facilities will be further described as integrated data storage.

1.4. A CONCEPTUAL FRAMEWORK : INTEGRATED DATA BASES, DATA EXCHANGE

It seems to be useful therefore to break down the data bank concept into its main components in order to afford an adequate understanding of advanced automation and the potential of rationalisation it promises to public administration. The key concept for rationalising the work of public administration is that of integrated data storage. It does not envisage the physical centralisation of stored data in one place, but their logical integration :

- their common use in several administrative processes;
- their sharing by different agencies;
- their combination into sets of data providing new meaningful information.

Integration of data storage means that data provided or generated by different branches of public administration are stored in such a way as to keep them available to other branches, and that records of stored data may be linked by common identifiers. If this is true for a whole set of records, this set may be called an integrated data base.

The integration of data storage may, in turn, result in the integration of formerly disparate administrative processes or agencies. The various administrative functions are interrelated, and different departments or agencies often have common data requirements. It is probable that the major part (possibly some 80 per cent) of all data kept by public administration on its environment are common to several processes or agencies.

The integration of formerly disparate administrative units or processes may be called "organisational integration". This concept must not be confused with integration of data storage which refers to data organisation (data structure). Data should be organised in such a way as to permit the use of the data for a series of applications or administrative procedures which may not yet be completely determined.

Data storage integration could be a factor for the promotion of organisational integration, as it permits the common use of data in several administrative processes, their sharing by different agencies, and their combination into sets of data providing new meaningful information.

Yet it must be stressed that organisational integration is possible without integrated data storage in computer memories and without information technology at all. A factor nearly as important as integrated data storage is the exchange of data among different agencies. Data exchange was practised before the introduction of information technology but in connection with automation it is gaining in importance, as data may be exchanged more easily in machine-readable form; either on magnetic tape or directly by data transmission among computers and from or to terminals.

Data exchange and integrated data bases may be of interest for day-to-day operations of public administration, as well as for other functions such as planning, statistics, social research. Whereas for administrative routine tasks data sharing and integrated data bases constitute a mere expediency, they are a necessity for supporting planning processes or providing "instant" statistics with data drawn from administrative operations.

However, the tangible short-term benefits of data sharing and integrated data bases seem to concern only the day-to-day work of public administration. It remains doubtful whether integrated data bases, either specially dedicated to planning purposes or common to both operational and planning tasks, can really be of use to urban and

regional planners. This is due to the fact that considerable problems are implied in defining which data are needed for urban and regional planning purposes *. On the other hand, integration of data storage (integrated data bases) may be a strong factor leading toward integration and reorganisation of (operative) administrative processes and institutions. The common memory which information technology makes available to the State and thus to the entire public administration, may lead to changes both in the functional and institutional organisation of public administration and in its relations with its environment. Despite the high commonality of data needs in operational tasks, an elaborate division of labour within public administration was up to now required to make manual record-keeping tasks manageable, leading to extensive fragmentation. With the availability of information technology it may no longer be necessary to prolong this situation.

Thus, the focus is shifting from data storage integration to the integration and reorganisation of basic administration functions **. Integrated data bases as the main factor of advanced automation in public administration could be a key element in this context. To give only one example in the field of population registration : birth registers, municipal address registration, statistical files, taxpayers' files, could be "integrated" and the result might even be the closing down of some of the institutions in charge of registration.

1.5. ADVANCED MODELS

The concepts of the data bank may be illustrated by briefly describing a widely known model of a "unified information system". This should stress the apparent contradiction between such a model and the existing piecemeal implementations. A second model is then described which makes use of the conceptual framework introduced here. It is specially suited for developing, and understanding, advanced forms of automation like those described in Part Two.

THE UNIFIED INFORMATION SYSTEM

In 1963 Hearle and Mason *** set up the concept of a "unified information system" serving the state and local governments in a particular state. Its object would be to reduce duplication in the collection, storage and processing of data and increase the accessibility and usefulness of these data to state and local agencies.

* This problem is further developed in Paul Kenneth and Claude Maestre (AA22). See also Fehl (AA10).

** Keston (AA05), p. 25.

*** Hearle and Mason (AA01).

"In essence, the United Information System provides an Information Centre to store and process data that are gathered and used by state and local governments within a particular state. The System is designed primarily to enable environmental data to be efficiently organised into records about the persons or property they describe. These data would be gathered in the regular operations of government agencies and transmitted to the Information Centre via communication channels. Similarly, agencies could obtain from the Centre either raw or processed data. The System does not require the collection of any new data and is entirely independent of the purposes or procedures for which the data are used. It simply provides a technological facility to file these data and to process them according to the instructions of participating agencies. Therefore it does not alter the present relationships between any citizen and the government or those between government agencies"*.

The Centre may be situated at more than one physical location. It is more than a service bureau; it is a central element of a comprehensive system. It should be organisationally separate from any existing unit of government; it should be a public agency with no power to make policy affecting the operations of the participating agencies. It should be financed entirely by charges for services rendered.

The system involves central files of common data about persons, real estate and personal property and the connection of these files through communication lines to the agencies gathering and using the data. It is based on the observation that state and local governments conventionally organise data around their functional uses, such as police data, welfare data etc. This practice has created many parallel data systems; hence duplication could be reduced by a unified information system.

According to Hearle and Mason, the data items commonly used in state and local governments may be categorised as either environmental data or internal data of government agencies. Environmental data may be divided into data on persons, on real estate and on personal property. Internal data refer to resources owned or controlled by governmental agencies.

These resources consist of money, employees, equipment and facilities. It is stated that internal data are of interest only to single agencies, whereas environmental data are of interest to many. Therefore, only environmental data are considered. Data items concerning real estate, persons, and personal property are listed, as are also state and local government functions.

Hearle and Mason insist that their concept does not involve changes in the functions, the basic organisational structure or the management responsibility of government units. It does not concentrate on the

* Hearle and Mason (AA01).

operations of any specific agency but on the total complex of "functions" performed by state or local governments.

Thus, the authors claim that their analysis is not hampered by the organisational problems that frequently dominate the design of systems for a particular city, state or country.

The authors are well aware of the fact that they are formulating a long range system which they thought suitable for implementation in the 1970-1975 period. They recognise that a state-wide intergovernmental information system cannot be achieved either immediately or in one single step. However, they do not propose the incremental development of the system by first developing basic common data files, such as real estate registers with only a few data items, etc. Rather, they urge that the various governmental units should develop fully fledged information systems that satisfy their own needs. These should be designed as small replicas of the united information system. They should be made comprehensive within the whole government unit, not confined to a single functional department within the unit.

The way which was indicated to implement the unified statewide information system seemed thus to pass by the creation of miniature systems that would later on be recognised as largely overlapping. No effort was made to identify any easy-to-develop modules of the future system. The authors seemed to be prisoners of the management information system concept. But even more decisive might have been their unwillingness to go into details of public administration. These details will finally decide the feasibility of their far-reaching concept. The deliberate disregard of organisational problems may partly explain why Hearle and Mason's model has never been implemented.

A CATALOGUE OF ADMINISTRATIVE FUNCTIONS SUITABLE FOR AUTOMATION

In the meantime other models have been developed on similar lines, but some of the pitfalls of the Hearle and Mason model have been avoided. A model is described here which takes into account the particularity of a (European) public administration environment. The results of the work of the Kommunale Gemeinschaftsstelle für Verwaltungsvereinfachung (K.G.St. : Local Authority Joint Centre for the Simplification of Administration) in Germany may serve as an adequate guideline for the successful and efficient introduction of automation in public administration *. The efforts of this organisation were first directed at the automation of routine procedures. However, they also aim at the implementation of advanced forms of automation.

* For a more extensive discussion of the work of this organisation see Paul Kenneth and Claude Maestre (AA22), from where the following description is partly drawn.

As early as 1957, this organisation realised that one of the best steps towards the organisation of data processing for public authorities is the systematic compilation of all administrative functions to be automated. The K.G.St. has therefore constructed a "catalogue of functions" (Funktions-Katalog), its latest elaboration dating from 1969 *.

Like the Hearle and Mason model, this catalogue is oriented not towards existing administrative procedures but administrative tasks. These are grouped in such a way as to show where the same or similar data are required for carrying out these tasks. The term "function" in this context is somewhat misleading, as this catalogue does not yet consider in detail the functional organisation of public administration, i.e., the administrative processes. However, the catalogue also abstracts from the institutional organisation of public administration, since the "functions" are grouped almost without regard to the branches of administration executing them. By its degree of sophistication, the elaboration of the catalogue of functions differs from the rather haphazard listing of functions in Hearle and Mason, where, for example, such functions as "Regulation and Licensing" or "General Government" appear **.

In the catalogue of functions of the K.G.St., all functions of local administration to be possibly automated are broken down into six main function groups :

- Personnel
- Finance
- Population
- Real Estate, Construction, Urban Development
- Documentation and Information
- Scientific Computation.

The fields of application are further elaborated within these basic function groups ***.

This model has already served for some time as an effective guideline to the development of automation in local authorities of Germany. Länder such as Hessen have adopted the K.G.St. model and adapted it to their own needs ****.

* K.G.St. (GE16).
** Hearle and Mason (AA01), p. 12ff.
*** K.G.St. (GE16).
**** Hessen 80 (GE04), pp. 147ff.

As this catalogue of functions is still very rough, efforts are being undertaken by the K. G. St. to investigate each of the main function groups further. This has already led to the design of a model more oriented towards functional organisation, i. e., the administrative processes. A Framework Model for Automation in the field of Construction and Urban Development (Automation im Bauwesen) * tries to promote co-ordination and co-operation of the single functional parts by carefully designing the administrative processes within the function group of construction and urban development. This should guide future developments in such a way as to fit later into a global municipal information system comprising all the different functions.

The "Framework Model for Automation in the field of Construction and Urban Development" breaks down the entire set of tasks related to that function group into seven functional areas, in no way influenced by institutional or occupational frontiers. It contains an enumeration of all data required for the different functional areas. It then gives a list showing in which of the functional areas these data may be processed, following fixed programmes, (and thus which functional areas are suitable for automation). Within these functional areas detailed integration concepts are being developed.

The model starts from the assumption that common data bases for person-related data, for real estate data and for financial data, provide data for the execution of tasks in the various functional areas. After processing, these and other data may be retransferred for updating the data bases.

The efforts of the K. G. St. in the field of integrated data processing do not aim at immediate full implementation, but rather at defining minor steps that would later fit into a more comprehensive system. This takes into account the fact that the available knowledge about functional organisation of the work of public administration is still inadequate for the successful automation of large groups of tasks. It is felt that it would be useless to discuss integration without reaching first a careful definition of the elements to be integrated.

Although it has become commonplace to state that large systems can be built only step by step, not many efforts are being made elsewhere to identify the elements to be integrated and to define the single steps. Therefore, the approach of K. G. St. may be of value to the general discussion, at least in providing a frame of reference for the assessment of the current situation.

* Automation im Bauwesen (GE17).

Part Two

DATA BASE DEVELOPMENT IN SOME EUROPEAN PUBLIC ADMINISTRATIONS

An apparent contradiction exists between complex models of generalised information systems and the existing piecemeal developments. This contradiction will be elaborated upon here in the description of some of the most advanced applications in European Member countries of OECD.

The basic components of the K.G.St. model, as well as of similar ones * are several administrative registers identifying persons, real estate parcels, and certain personal property items (vehicles, etc.). The creation of such basic registers is envisaged in several, mainly European, countries. Automated population registers and motor vehicle registers are at present being developed to some extent on a national or regional level. A few attempts to develop computerised real estate registers can also be found, chiefly at the local level.

The following description of some of these efforts tries to pave the way towards a better understanding of the situation which might result in the formulation of criteria for policy choices to guide future developments. It is concentrated on the automation of population registration in several countries.

The only country discussed here in any great detail is Sweden; further examples are from other countries where implementations or discussions are sufficiently advanced and where conclusive experience was available. Documentation of available written material from these, as well as from other OECD Member countries, is appended. In some cases plans for further integration are also briefly discussed. Conclusions from this descriptive part will be drawn in the subsequent parts of this report.

The countries described were chosen among OECD Member countries for their comparable administrative systems and their comparable level

* Similar models may be found in Mitchel (AA24), Salomonsson (AA19), Gaits (AA17).

of ADP application in the public sector. In accordance with these criteria only countries with a public administration built up in the continental European legal tradition have been taken into account. Therefore, although such a proceeding may be criticised, Australia, Canada, Japan, the United Kingdom and the United States have been excluded. By this it should not be understood that their administrative systems are fundamentally different from those of the remaining OECD Member countries, but, as will be apparent later to the reader familiar with the administrative systems of these countries, some of the conclusions drawn in Parts Three and Four of this report may not be valid for these countries.

Of the remaining countries, preference was given to those where computerised population registers are being developed to a certain extent. The fact that some countries are described in less detail must not lead to the assumption that developments in countries that are mentioned only briefly are of minor importance or interest.

2.1. SWEDEN

The Swedish situation may be characterised by describing the development of centralised data bases with remote on-line inquiry facilities. Several of these are being built up at present by special task forces. The systems are designed to support existing administrative agencies in executing their tasks. Examples may be found in the field of land registration, population registration, car registration, law enforcement, social services and labour market administration. Most of them are scheduled to become operational for the whole country between 1973 (Central Population Register, Central Car Registration System) and 1976 (Land Data Bank, Social Service System). The degree of integration desirable between these large data bases is at present under discussion.

These Swedish projects concerning large administrative registers have already aroused considerable interest in many European and non-European countries * . Their presentation in this report is merely to provide a rough frame of reference for the discussion of policy and administrative problems related to their introduction and future operation.

The following is a short résumé of:

- the Swedish administrative system, particularly in regard to rationalisation by ADP;
- population registration and registration of business firms;
- car registration;

* See Cripps (SW07), or Systèmes publics d'information en Scandinavie (SW03).

- data bases in law enforcement and in the immigration authority;

- social services and labour market data bases;

- the land data bank;

- discussions, pilot studies and organisational framework to support and control the integration of these data bases.

The Swedish Administrative System *

Government and administration in Sweden are organised at two separate levels: ministries, and agencies or boards. The former are primarily responsible for the framing of policy, the latter for its execution. Officially, all policy decisions are taken by the King-in-Council, i. e. by the King following the advice of his Councillors (Ministers) in the weekly State Council sessions. The 12 ministries are quite small; most of them have about 100 employees. There are about 175 agencies either headed by a board or by a Director-General only. The agencies are officially subordinate only to the King-in-Council who gives them directives. However, in practice an agency comes under one ministry to which it reports and which prepares the relevant decisions of the King-in-Council.

An important role in the Swedish administrative system is played by Royal Committees. Normally when a reform of some significance is considered, a committee is appointed. Its composition varies with the nature of the task; there may be public officials, experts, representatives of interest groups, Members of Parliament. The work of the committees is regulated by Government directives. This system of committees means that most of the basic studies which in other countries are performed within the administration or by outside, consulting organisations, are carried out in Sweden by autonomous bodies. This also helps to keep the ministries down to a reasonable size. At present, there are three committees dealing with questions of automation. Their work is discussed briefly below.

A special agency under the Ministry of Finance is in charge of rationalising State administration. This is the Swedish Agency for Administrative Development, which bears the name of one of the oldest Swedish government agencies: Statskontoret. Its main tasks are to plan and - together with the agencies concerned - carry out rationalisation measures within the State administration and to promote savings through advice and information. Statskontoret was given its present responsibilities in organisation and management of public administration in 1961. Under the assumption that automation will be one of the most important tools for rationalisation, the responsibilities of Statskontoret were extended in 1963 to include this sector. Statskontoret is responsible for

* For more details see Pierre Vinde (SW01).

coordinating the selection, acquisition and utilisation of computers in Swedish public administration. Since 1969, all state-managed computers are procured through a Special Computer Fund, managed by Statskontoret. The equipment is then leased to the various agencies.

Most agencies do not operate own data processing facilities, but the principal users, such as the Central Bureau of Statistics (Statistiska Centralbyran, SCB) or the National Tax Board (Riksskatteverket, RSV) in charge of population registration usually have their own computers. Many agencies use the services of a special service bureau, DAFA, for carrying out their routine DP work, and partly, too, for systems development and programming. DAFA (Datamaskincentralen för Administrativ Databehandlingen) is a government agency with public status working very much like a private service bureau. DAFA charges the agencies for its services, but it must not make a profit. Some 5-10 per cent of its workload comes from the private sector. Within the government, DAFA is at present working for about 40 organisations. Among them are the agency in charge of building up the land data bank, the Labour Market administration, the Immigration Authority and the National Accounting Bureau.

In 1969, a state-owned corporation, AB Statskonsult, was created to provide consultancy in ADP development, mainly in the public sector. It has been given several important systems development responsibilities, such as the central car registration system. While Statskonsult engages primarily in the developments of larger systems as consultants to the project leading agency - which can be Statskontoret or the agency directly concerned - DAFA renders computer services, provides systems maintenance, participates in the implementation of new systems, and, in addition, gives independent consultancy service on smaller projects.

Population registration

The actual situation in the automation of population registration in Sweden is fairly complex, as population registers are or will be kept at three different levels; in the parishes, in the counties and at national level *.

For over 200 years, each parish in the Swedish church has had a complete register of the inhabitants within the parish. These registers are still administered by the parish ministers who, as registration officers, are considered as public officials. The boundaries of the parishes (about 1,800) are not identical with those of the 474 Swedish municipalities. At present discussions are taking place on the subject of transferring these registration tasks to the 120 local Tax Assessment offices, but no decision has as yet been taken, the relations between State and Church being subject to thorough reconsideration.

* The Swedish population registration system is well documented as it meets considerable interest from abroad. For the latest version see SW11.

Individuals have to report births, deaths and change of residence to the parish offices, where registers are kept manually. The parish registers contain such data as name, date and place of birth, residence, nationality, sex and several other items.

Still at the local level, but separate from the parish offices, the 120 local Tax Assessment Offices keep paper card registers of the population and the real estate within their area.

At county level, there are three different computerised registers: a population register, a taxation register and a register of real estate for taxation purposes. These registers are stored on magnetic tape by the 24 County administrations (länsstyrelserna), which, under the supervision of the National Tax Board (Riksskatteverket, RSV), are responsible both for taxation of income and population registration. All counties have data offices, but only 15 county data offices are equipped with computers, some of them serving two adjacent counties. The counties allocate the personal identification number to new-born children. This number was introduced in Sweden as early as 1947.

The computerised county population registers are operational since 1967. Besides basic identification data they contain a wide variety of information, e. g. on the next of kin, nationality, membership of the Swedish Church, legal incapacity, insurance and welfare benefit status, preliminary tax code, military service liability, possession of firearms. The register also holds information about tax liability which is used to set up a record in the (separate) taxation register.

The county population register is updated once a week with all changes of population data as reported by the parish offices. Notifications of these changes are sent, either on magnetic tape or on paper cards, to a wide range of authorities, some of which are mentioned below. Several private companies also get this information on payment of a fee. The register is used, too, for periodical output of selected population data to various users, e. g. lists of school children are given to school authorities.

Besides the population register on magnetic tape the counties keep two paper registers of personal data cards printed out from the computerised register. One of these paper registers, arranged by person identification numbers, contains all the information also stored on magnetic tape. The other paper register, arranged alphabetically by name, provides only reference to the first register. These two registers serve for inquiry purposes. Inquiries into population data, both from agencies and private persons, are very frequent, and the person number is generally used.

In the County office in Stockholm for example, 25 employees are giving information, mainly by telephone, from the population card registers. There are plans to replace these card registers by video display terminals connected to the new Central Population Register

described below. In the case of the county of Stockholm, 20 terminals will be required.

The taxation register is based on the resident status as on 1st November of each year. This information is provided by the population register from which lists are printed and sent to the parish offices, which check them against their books. On the basis of the lists, each parish prepares a domiciliary register (mantalsskrivning). The taxation registers are arranged by residence and the taxpayers are identified by their person numbers.

The taxation register supports the whole procedure of income tax collection. Preliminary taxes are calculated on the basis of the income assessments made by the local assessment boards (which are not identical with the local tax collection offices, but bodies of citizens generally without civil service status). If the taxpayer is employed, the preliminary tax is withheld by the employer monthly and transferred to the tax collection offices six times a year. At the end of the following year, overpaid tax is reimbursed and underpaid tax collected.

The county real estate register also serves taxation purposes. Each of the 2,500,000 Swedish real estates is given an identification number. The owners are identified by their person numbers.

The present computerised system on the county level has been built up by a special authority which took over the responsibility for population registration from the Central Bureau of Statistics. This authority, the National Board of Civic Registration and Tax Collection (Centrala Folkbokförings-och Uppbördsnämnden, CFU), was created in 1962 and merged in 1971, together with the formerly independent agencies for direct and indirect taxes, into the National Tax Board (Riksskatteverket, RSV).

At the national level, a total population register is stored on magnetic tape in the Central Bureau of Statistics (SCB). It is updated 10-15 times a year with the change tapes from the county data offices. It is mainly used for statistical purposes. Several sub-registers are linked to it. At the end of each year a summary of the register is produced and archived.

At present the total population register of SCB does not only serve statistical purposes, but is also used in inquiries and data exchange with other agencies and private firms (banks and insurance companies). Until recently, private business enterprises, too, were given address lists, but in deference to public concern over possible violation of privacy this has been stopped. The population register also serves as a basis for the census, which is carried out every five years.

Apart from the computerised registers at the county level, and the registers kept in the Central Bureau of Statistics, the National Tax Board has started developing a central population register (CPR).

The National Tax Board considers CPR to be a relatively modest step which will not cause any radical re-organisation of population registration; taxation and real estate registers at county level will continue to exist.

Two objectives are stated. First, it should serve as a basic register for other data bases. It could forward data on changes in population to other registers. This function is at present performed by the county data offices and SCB. The second main function of CPR will be to facilitate individual inquiries. At present the answers to these are given from the manual card registers available in the provincial data offices. The amount of individual population data asked for by authorities and private organisations or individuals is quite considerable and is continually increasing.

Plans to set up such a CPR must be seen against the background of the 200-year-old Swedish principle of public access to official records. This principle constitutes the main reason for the present high amount of individual inquiries into public registers and the frequent exchanges of population data among branches of administration.

The principle of publicity of official records has found its latest expression in the Swedish Press Act of 1949. It guarantees free access to government documents to every Swedish citizen. Public records are all documents of a definitive nature in the possession of State or local administration. Exceptions from this principle must be expressly permitted by law. Main exceptions concern police files and health and social aid documents, in accordance with the Secrecy Act of 1937. The rationale of the principle of public access to official documents in its present form is to permit public control of the work of public administration, and to enhance civic participation in public affairs.

As a result of population data being given to some private credit investigation or publicity firms, considerable concern is expressed that, with random access computerised population data bases, the unlimited maintenance of the publicity principle might lead to the invasion of personal privacy and constitute a political danger. For this reason, the development of CPR was provisionally stopped in April 1972 by a Parliament decision, until adequate legislation is worked out to prevent misuse. Such legislation is to be drafted by the Royal Committee on Publicity and Secrecy, appointed in 1969, whose work will again be mentioned below.

In line with its original design, the information in CPR will be available through various channels. Occasional inquiries, mainly by telephone, will be made to the county offices where display units will be located. Mass inquiries by letter, magnetic tape or punch cards will be directed to the CPR Centre. It is anticipated that affiliated authorities or private organisations will be given permission to connect their own terminals to CPR or to use their own computers as concentrators to the CPR computer for their own terminal traffic.

The CPR will be run on the upgraded ins allations of the county data office in Stockholm. Forty-one disc units with 52 million characters each will be available, the main register of persons consisting of 1,580 million characters. Display units at the county offices will be connected to CPR via leased lines at a line speed of 2,400 baud. The number of display terminals in the county offices will vary with the volume of inquiries from 2 to 20 (County of Stockholm).

At the initial stage, the system is expected to receive about 60,000 inquiries during a top-load day. Of these, it is estimated that 20,000 will come from the county offices and the other 40,000 from other affiliated users. The system will be adapted to a maximum of about 180,000 inquiries per day. The maximum reply time for about 95 per cent of the terminal inquiries is estimated at 7 seconds.

The costs for the development of CPR are estimated at SKr 4-5 million. The annual operating costs are also estimated at SKr 4-5 million.

Registration of business firms

The main register of business firms is kept at the Central Bureau of Statistics. However, the taxation registers held in the county data offices also contain information on legal persons. These tax registers and the social service institutions are the main sources of information for the enterprise register of SCB.

The central enterprise register of SCB has been kept on magnetic tape since 1966. It was designed not only to serve as a statistical file but also to constitute one of the three basic registers: population, enterprises, real estate. As it is oriented towards business firms, not towards legal persons, there may be changes in the taxation registers that are important for purposes of taxation but not of statistics and registration. A change of owner may interest the tax authorities, but the enterprise as such still remains the same. Therefore SCB is developing internal links in order to follow an enterprise over a certain period. The register is now updated quite often, but until very recently it was updated only once each year.

Car registration

The new Swedish car registration system * is in the stage of being implemented. It will consist of a central data base replacing the manual card registers at present kept in the county car registration offices. These county offices will still be the registration authorities. They will be equipped with a total of 166 display terminals connected via leased lines to the computers (2 UNIVAC 1106). The data base will be stored on magnetic drums.

* The design of this system is shown in SW46.

The system which is designed to serve a wide range of objectives, will support several administrative routines:

- It will speed up the registration procedure, which will be done in one night instead of several weeks as at present. The person applying for registration will not be required to appear at the office. In the registration routine, a paper tape will be produced and sent to a central car plate manufacturer where it steers the production process. Besides the registration number allotted by the computer the chassis number will also be printed on the plates. These are then sent by mail to the car owner. When the owner has fulfilled the car inspection and car insurance requirements and paid the car tax he will receive a registration notice consisting of a technical specification and a reporting section. The latter is to be used for communicating changes of ownership and de-registration of cars.

- It will keep track of insurance payments, and take care of the whole car taxation and tax collection process. It will follow up the yearly car inspection carried out by a special company, and will provide the Central Bureau of Statistics with statistics.

- For registration purposes about 15,000 daily terminal transactions are expected. About 50,000 daily transactions, mainly concerning taxation, insurance and inspection will be entered on magnetic tape.

- The system will further permit on-line inquiries to the data base from the county offices and probably later on from insurance companies and the car trade as well. Twenty-five thousand questions per day are expected. The average answer time will be 3 seconds.

The display terminals will be used both for questions and for transaction input. The number of displays per county office is designed to meet the demand for inquiries during peak-load hours, in order to keep a satisfactory service level. During the rest of the day this extra capacity can be used for transaction input.

All updating will be made sequentially in the evening when the load on the real-time system is very low. The system has to be available around the clock. It will be possible to answer questions even during the updating, as the entire data base will be duplicated on drums.

The data base will consist of an owner file and a vehicle file. A number of sub-files will be connected to these main files. The vehicle file will contain only data which are unique for each car. Technical specifications will be stored in a model code file. Among the other special files there will be a special file to watch special vehicles, and a chassis number file which will be organised in such a way as to permit

retrieval of a car the registration number of which is unknown. In addition, a special index file will permit access by person number to the owners' register. Thus a wide variety of entries in the data base will be possible.

The implementation of the system is fairly complicated, as the county card registers lack the owners' person numbers and some other data items. Forms are therefore being sent to all inhabitants over the age of 16. The answers are checked against the information in the manual registers. This system has already worked well in one county where the new system is starting its operations.

From the very beginning it will be possible for the police to put questions to the file by telex. Later on the existing police register on stolen cars will be copied and all messages about stolen cars will be exchanged.

The question of whether the car registration system should have a person file of its own has been considered. The number of inquiries expected in both the central population register and the car registration system is so high that a separate solution has been preferred.

The development of the system will cost about SKr 45 million (excluding hardware costs). A special office, the Central Car Registry Office (Centrala bilregisternämnden), was created in 1971 to implement the system. Statskonsult A. B. has played, and is still playing, an important role in system design and programming. The computers will be transferred later to the Central Bureau of Statistics, but the responsibility for the files will remain with the car register office or the Traffic Safety Board.

Law enforcement

The Swedish National Police Board (Rikspolisstyrelsen) has data bases, that may be interrogated and updated on-line, for information on stolen cars and wanted persons. It is furthermore developing a register of persons and offences (Person-och belastningsregister, PBR) which will combine the criminal sentence registers and the Police Board's personal register *.

The data base on stolen cars has been operational since 1969. It contains information on about 12,000 stolen cars. 3,000 transactions are handled daily coming from 350 telex terminals situated in about 300 police offices in the 119 police districts.

The data base on wanted persons, which has been operational since 1970, presents similar characteristics, with the difference, however, that the data base may only in exceptional cases be updated from each telex terminal.

* Little documentation is at present available. See, however, SW44 and SW42.

The chief project within the National Police Board is the Register of persons and offences (PBR), due to be operational in 1972. PBR will be a random file containing a total of some 600 million characters of information on 350,000 persons. On-line inquiries will not be possible in a first phase. The system is based on the co-operation of the police, the courts, the public prosecutors and several other agencies. Police, courts and prosecutors are all under the authority of the Ministry of Justice. The 119 police districts supply the system with crime reports, suspect sheets, warrants and breach of regulation orders (Ordningsförelägganden). The number of crime reports is estimated at 500,000 per year and suspect sheets at 160,000 per year. The public prosecutors' decisions on whether to prosecute or not, as well as their orders of summary punishment will also be entered. The system will further be furnished with about 130,000 sentences passed by the courts annually.

The register will contain no addresses of persons, but their personal identification numbers. It will receive regular information from the Central Bureau of Statistics on deaths and changes of names. Once the new central population register is implemented, it will take over the provision of such information. However, the CPR will contain no indications as to whether data about a person is stored in PBR or not.

The primary purpose of the system is to produce extracts from the criminal register and from the central police registers and to distribute them to a wide range of authorities, especially the public prosecutors and the police. Unlike most other public registers in Sweden, PBR and other police files are not open for inspection or inquiries from the public. However, the non-aggregated data are also delivered to the Central Bureau of Statistics for statistics on crime rates and solved crimes.

The development of this system is designed to permit the progressive discontinuance of several manual registers. It is considered as being one stage in the Judicial Information System (Rättsväsendets Informationssystem, R.I), the purpose of which is to avoid duplication and to simplify and rationalise work within the whole judicial system. As a part of this larger system, PBR will be supervised by a joint body including representatives from the Ministry of Justice, the Courts, the Office of the Chief Public Prosecutor, Statskontoret, the Central Bureau of Statistics and the National Police Board.

The register will be run on the installations available at the National Police Board's Data Office, namely a GE 427 duplex system with four magnetic card drives. New computers will be installed in 1974. On this occasion, important steps may be taken to connect the new computer directly to the car register and the central population register.

Immigration

The immigration file of the National Immigration Board (Statens Invandrarverk) is computerised on direct access media , in September 1972. At present it contains data on about 300,000 immigrants from non-Scandinavian countries. The system will be fully operational in July 1973. It is designed primarily to keep track of residence permits granted to aliens . Several entries to the register will be possible: by person number, name, nationality and sex, and dossier number.

The register gets its information by mail from the police stations where immigrants must apply. Independently of this, the National Tax Board gets information on employed aliens from the employers. It then allocates a person number centrally which is communicated by tape to the Immigration Board. An information transfer in the opposite direction is also being considered but no decision has yet been taken.

The system will be run by DAFA. Display terminals will be installed at the office of the Immigration Board in Stockholm. The National Police Board intends to establish direct connection between computers in order to have direct access to the register from all its telex terminals.

Social service and labour market

In the social service sector a special rationalisation board (Rationaliseringen av den allmänna försäkringens administration, RAFA) is in charge of developing a centralised system for administering health insurance and old-age pensions. The pensions system will be operational in 1973. The health insurance system will be implemented region by region, starting in 1973. It is scheduled to cover the whole of Sweden by 1976.

At present, the monthly payment of 1,300,000 old-age pensions is already centralised and supported by a computerised file stored on magnetic tape. With the new system, the person and pension status data will be stored on direct access media. The main register of the data base, namely the pension register, will contain about 325 million characters. The 26 districts and about 500 local social service offices will be equipped progressively with terminals and will have direct access to the data base via leased lines at a transmission speed of 2,400 baud. This will mainly be used for inquiries; as the social service registers are also public registers, there are many inquiries coming chiefly from employers. It is expected that there will be peak periods with 450 inquiries per hour on old-age pensions.

The task of automating the health insurance system is much bigger than that of automating the pensions system. Health insurance is at present administered at local or district levels with manual registers only. Important savings in manpower in this sector are anticipated.

Unofficially it is estimated that staff of the general social service administration could be reduced from 9,000 to 7,000, since most of its members are at present employed on health insurance. It may be worthwhile mentioning that the administrative costs of the whole Swedish social service system amounts to SKr 300 million per year. RAFA's present budget is SKr 12 million per year.

Another central person file is built up with the Swedish Labour Market Administration (Arbedsmarknadsverket) *. It is designed to permit inquiries on persons seeking enployment. Some terminals have already been installed in District Labour Offices. For the other counties inquiries are made by telephone. At present the system does not aim at matching job applications to job vacancies. About 4,000 inquiries per day (about 1,200 during the peak hours) are expected when the system is operational for the whole of Sweden.

The land data bank

The development of a rational computerised land data bank was approved by the Swedish parliament in 1968. This was preceded by a comprehensive feasibility study in the field of real estate registration (Cadaster) **. At the outset it was decided that two distinct registers at present kept by different authorities, namely the real estate register (Cadaster) and the land register (a register of ownerships, servitudes, mortgages and other rights to land) should be integrated technically. Both registers should, however, continue to be maintained separately by the county surveyors and the courts respectively.

The integration of these two registers was felt to be possible and desirable, as both employ the same notion of "real estate units", and as the real estate register identifies the area of land to which in land rights refer.

In the land data bank all real estate units will be identified by a unique official notation. At present, several types of real estate registration systems exist, for both rural areas and for towns. The urban notation is currently being changed to a form compatible with the rural notation. The new notations for real estate units will be the primary search keys for the register. Yet another notation is employed by the county real estate registers for taxation purposes. No attempts are being made to provide for standardization.

In addition, each real estate unit and each building on such a unit will be identified by co-ordinates in a square co-ordinate system covering the whole of Sweden. The choice of a co-ordinate system was motivated by the possibilities it provides for producing sophisticated geographical

* See the report on the labour market administration (SW41).
** Fastighetsregistrering (SW21), with an English summary on pp. 309ff.

data and applying computer cartography. Its adoption was preceded by an experiment in a part of the province of Östergötland *.

A separate study has been carried out on the reorganisation of the land register in connection with the changeover to ADP **. This register is at present kept by the 137 Swedish Courts of first instance. In 1968 more than 1,000,000 registrations were made and 460,000 extracts of the register were delivered concerning a total of 2,500,000 real estate units in Sweden. The data bank will contain only those parts of the land register that are of practical relevance. The number of the courts in charge of the register will be reduced to 24 (one for each county).

The land data bank is being implemented*** by the Central Board for Real Estate Data (Centralnämnden för fastighetsdata, CFD). This central organisation will function essentially as a technical service organisation. Data will be supplied directly by the offices in charge of maintaining the registers to the central data base.

In 1971, an experimental data bank was set up in the county of Uppsala. Cadaster data on 41,000 real estate units and land register data on 27,000 real estate units were entered. Besides the data from both manual registers, the co-ordinates and the address of the real estate units, as well as the person numbers and addresses of the respective owners, were registered.

Unlike the real estate register data, the land register data were entered directly by terminal via a leased line to the central computers of DAFA (IBM 360/50 in the beginning, 360/65 later on) which have served during the experiment. It is reported that some transmission errors (at a transmission speed of 2,400 baud) occurred. The land register data were carefully prepared by two of the three Uppsala county courts involved in the experiment. Some simplification in the land register books and also in the legal status of real estates was necessary.

During the experiment about 300 questions daily were put to the data bank from the land register and the real estate registration authorities respectively. However, in the case of the land register, the manual files had to be utilised too, as printouts of the computerised land register have not yet been given legal status as land register documents. Also connected to the data bank which was "opened" during working hours were the town engineering bureaux of Uppsala and Enköping.

Most important are the conclusions on rationalisation effects drawn from the (continuing) Uppsala experiment ****. It is estimated that the

* See SW22.

** ADP inom inskrivningsväsendet (SW23). For an English summary see SW24.

*** See Wallner (SW25), and, for a more recent version, Wallner (SW27).

**** See (SW26).

land data bank for the whole of Sweden will have a very short pay-off time. Rationalisation efforts will be particularly important for the land register section where the annual cost of the new system (including hardware, personnel and introduction costs) is estimated at SKr 18.8 million, whereas the personnel costs for the present manual system were calculated at SKr 21.5 in 1967 with a workload which was 25 per cent less *. In addition, the quality of the service should be considerably improved by the changeover to ADP, as the average time for handling one transaction could be cut down from two weeks to 1 - 4 days.

The final system covering the whole of Sweden will not be operational before 1976. In 1972 the Uppsala experiment is being extended to cover the whole county. In several other counties co-ordinates are being attributed to real estate units and buildings, and the real estate notation is being unified. It is estimated that the final system will serve about 150 terminal offices with an average of five display units each. (24 land register offices in courts, 80 district land surveyors, 50 city engineers and surveyor offices).

Separate efforts are being undertaken to build a road data bank. This work is being carried out by the Swedish National Road Board, and seems to be still in its beginning **. It is not yet possible to define the integration links between this new register and the land data bank.

Trends towards the integration of large data bases

All central data bases reviewed are being built up independently. Although data exchange among agencies is very common in Sweden, only a few efforts have been made until now to develop truly integrated systems enabling a wide variety of agencies to draw directly upon the same data base. These efforts concern such fields as law enforcement, or land data. This is due to the fact that in principle the agencies themselves develop the automated systems to support their daily work.

However, efforts aiming at integrating data bases have been undertaken by the Central Bureau of Statistics especially with a view to gathering statistical data, or data for societal planning from existing administrative registers. These efforts are influenced by a "Statistical File System" proposed by the Norwegian Statistician Nordbotten ***. This system aims at the establishment of basic registers for population, business firms and real estate units that serve operative purposes of public administration and at the same time feed archive registers. In this way, data originally collected for non-statistical purposes are made available for statistical use at a low cost. As unaggregated data are used for the production of statistics, differing requirements of the users of statistical data can be met.

* (SW26), pp. 66ff. and Appendix 1.

** Cf. (SW45).

*** Nordbotten (AA21) and Ohlsson (SW08).

This model has been a guideline for the work of the Central Bureau of Statistics , which has been re-organised around three large data bases for population, enterprise and land data. A considerable amount of development work is dedicated to creating a coherent statistical file system. This system utilises data from other public administration areas and keeps them stored in data bases for further use in the production of statistics.

A similar idea seems to have inspired the design of the land data bank. Although this project mainly aims at rationalisation effects in administrative operations that can be obtained by employing data bases, one of its objectives has also been to investigate the possibility of providing meaningful information for urban, regional and national planning. One of the departments of the Central Board for Real Estate Data has carried out a pilot study under the name of "FRIS" which develops and tests the idea of data base integration for planning purposes. This project concerns the Enköping district, which is part of the province of Uppsala. Its design should pave the way for integration of the three basic registers (personal, business, land) and any related special registers. The main objective is to provide relevant decision-making data for urban and regional development.

The data bases of "FRIS" are designed to reduce to a minimum the constraints of data organisation. Practically any register can be accepted in one of the data bases provided it contains identification keys suitable for integration with the other keys in the system. This approach, requiring a good deal of flexibility in the data handling system, should provide optimum conditions for studying the data needs of different types of users of the system. A more rigid structure of the data bases would prevent the study of these needs and such a design would imply that they were already known. Six data bases have been constructed: personal data, place of work, land parcels, premises, roads, highways.

This pilot study, which is particularly well documented * , seems, however, to have a considerably lower priority than the current development of the land data bank, as few short-term benefits are likely to result from it ** .

The whole question of integration is being considered at a higher level by a special Royal Committee on Co-ordination of Governmental Data Banks, appointed by the Minister of Finance in 1971. Most of its 12 members come from the major agencies or ministries involved in the construction of the large data bases described above.

The terms of present reference of this Committee *** give a precise account of the state of data base development. They indicate that the Committee's task is to follow current investigation and development

* Cf. (SW31) to (SW38).

** For details see Paul Kenneth and Claude Maestre (AA22).

*** Samordning och Kontroll av databanker (SW04).

work, and to initiate supplementary studies and similar activities so as to furnish a sound base for decisions concerning future ADP development, chiefly in the public sector.

The Committee's principal task will be to investigate the types of integration possible and desired in view of actual data bank development and with regard to the foreseeable technical developments. In this context estimations of economic payoff play an important role. The question of integration of data banks will be seen in all its complexity and the impact of possible solutions on all ADP activities will be assessed.

The Committee plans to consider technical and administrative standardization problems, the necessity and desirability of physical deconcentration of the principal data bases, as well as the opportunity of tying together the major systems in a special State data transmission network. The Committee intends to work out guiding principles for the automation policy of the Swedish government. It may also study the influence of ADP on the power structure of society. No time limit to the Committee's work has been set. The first results may be expected by 1974.

Besides this committee, two others are also concerned with problems of advanced automation in public administration .

A committee appointed by the Minister of Industry in 1971 has been given the task of investigating measures of industrial policy in the field of data technology. The two main aspects which will be investigated are the promoting of the competitiveness of the Swedish data industry, and of Swedish commerce and industry in general by enhanced ADP application.

The main task of the Royal Committee on Publicity and Secrecy is to investigate the whole question of publicity and secrecy. The Committee which was formed in 1969, published its first report on 30th June, 1972. This report covers two matters: first the application of the principle of public access to official records to computer-stored information, and proposes legislation for the protection of personal integrity in view of the risks of computerised filing of person-related data. The committee suggests legislation concerning public access to official computerised data, which should be of the same kind as the existing legislation concerning official documents. As a means of protection for personal integrity the Committee suggests a data legislation implying that special permission is needed for computerised filing of person-related data. A special authority should examine the applications for permissions and also exercise control functions in order to prevent undue offence of personal integrity. The legislation should also contain rules on the obligation to control the rightness of filed data for those making the files and on the right of those persons being filed to get information about the content of the file.

2.2. NORWAY

In Norway, as in other countries reviewed below, only automation in the field of population registration is mentioned. In addition, some appreciation of future development concerning data base integration is given.

The Norwegian system of population registration * differs to some extent from the Swedish system. The Central Bureau of Statistics is responsible for the whole system. Unlike the situation in Sweden the Tax Directorate is not involved at central level. ADP applications in population registration are not very sophisticated and the integration of population registration with other branches of administration still seems to be in its first stage.

Population registration in Norway first appeared at local level. In 1905, local authorities were permitted to establish population registers on a voluntary basis. Most of the towns and some rural districts established such registers. With the Act on Population Registers of 15th November, 1946, population registration was made mandatory for all the Norwegian municipalities (446 as of 1972). Following this Act, the population registers were administered by the local authorities which also had to bear the costs and were subject to control and direction by the Central Bureau of Statistics acting as the central office. In 1965, administration of the local population registers was transferred to state offices which also took over the tasks of the former municipal tax assessment offices. As far as the arrangement and utilisation of the local population registers is concerned, this led to well-established co-operation between the Central Bureau of Statistics and the tax authorities. The latter are responsible for the administration of the local offices and for the administrative costs.

In 1963 work started on the development of a central population register within the Central Bureau of Statistics. By utilising the schedules from the 1960 Population Census, cards were prepared for the entire population by place of residence as of 1st November, 1960. This material was supplemented by information on births and immigrations. A unique permanent identification number was assigned to each person and the cards distributed to the local population registers for checking names, birthdates, and other items of information. The local registers transferred the identification number to their manual and punch card registers.

All numbered cards were returned to the Central Bureau of Statistics and matched against the file used for the generation of person identification numbers. This gave a good and generally positive impression of the completeness and quality of local population registration. However, between 1964 and 1967, approximately 140,000 identification numbers, corresponding to 3.8 per cent of the population, were changed because

* Helge Skaug (NR01).

of discrepancies in dates of birth in the registers and in the census material. Part of the population census material had not been completely revised. Supplementary work became much more extensive than had been expected.

The entire population is thus registered both locally and centrally. However, the information items registered locally are more numerous and in part different from those registered centrally. Unlike the local registers, the central register also includes information about all persons registered as resident in Norway, and deceased, emigrated and missing persons to whom at some time personal identification numbers have been attributed. The data of the central register are stored on magnetic tape. Paper or microfilm printouts are kept in the offices of the Central Bureau of Statistics.

The updating procedure for the central and local registers is as follows: the parish ministers - in Norway there are approximately 1,080 established parishes - are still responsible for the civil registration of births, deaths and marriages. All this information is reported monthly by hospitals, etc., to the respective local population registers. Persons who move within the municipality are required to report changes of address directly to the population register office. Before moving to another municipality, a person must apply to the local office of his old residence. The local population registers are updated manually according to the new information. In addition, the card files are checked by the use of the schedules relating to the general population censuses. All registration material is sent twice a month to the Central Bureau of Statistics, where it is punched for updating the central population register. At this stage, the new material is carefully checked.

The main purpose of the central population register CPR is to be found in the provision of better statistics. This register corresponds to one of the three basic registers of the "Statistical file system" proposed by Nordbotten*. The person identification numbers have been attributed to the 1960 census data, available on magnetic tape. It is thus possible to combine such data, for the whole population or for specific age categories, with data from the CPR at any date later than 1964.

Some use is made of the CPR and of the person identification number in connection with administrative tasks performed by other agencies. Information for updating purposes is transferred regularly to the health authorities, the National Insurance Institution, tax directorate, the car registration system and the Ministry of Education.

The person identification numbers were introduced in the tax and social welfare administrations in 1966. The numbers were transferred to the tax rolls on the basis of the local punch card registers. The National Insurance Institution ordered printed lists from the Central

* See Nordbotten (NR07 and AA21)

Bureau of Statistics for the manual transmission of the identification numbers to their local and central administrative card files. It is expected that the present, rather low, degree of data sharing among different administrative agencies is bound to change with the installation of a National Service Centre for Administrative Data Processing.

The costs of establishing the actual CPR have been about U.S. $. 775,000. Maintenance costs of CPR and all local population registers, including monthly revision and processing of all schedules and documents, control and collection of supplementary information, are estimated at about US $2,700,000. Neither figure includes the cost of the preparation of statistics.

The development of a national real estate data base in Norway is still in its infancy. The "Geodata Committee" appointed by the Norwegian Ministry of Municipal Affairs in 1969, published a report in 1971 advocating the use of coordinate referencing. The Ministry of Agriculture conducted pilot studies on ADP registration of agricultural land. The Ministry of Justice has commissioned the government Institution of Organisation and Management (Statens Rasjonaliserings direktoratet) to study the feasibility of automation of the real estate register. The development may follow the Swedish pattern *. In the meantime a real estate data bank is being developed by the City of Oslo within the framework proposed by the "Geodata Committee". It is scheduled to become operational in 1972.

Important developments towards the integration of administrative data bases can be expected in Norway in the next few years. This may be concluded from the efficient work of the Government Institution of Organisation and Management which carries out both the former O and M (organisation and methods) functions and ADP development functions as well as from the decision, taken in 1971, to create a Norwegian State Computer Centre (Statens Driftsentral for Administrative Databehandling) **. The general policy of the Norwegien government is that the Centre should function as a service bureau and be responsible for meeting the requirements of the various government departments for computing facilities. Unlike Datacentralen in Denmark, the Centre is to have no responsibility for planning and systems development, so that the task of automation and the promotion of further integration will rely entirely on the Rationalisation Board and the operating agencies concerned. However, in conjunction with [illegible] efforts to have the major agencies share common computing facili[illegible], steps have been made to promote co-operation among these agencies. It is planned to set up a User's Council on which the major agencies will be represented and which could stimulate further integration. At present it has been decided that the Central Bureau of Statistics will be the main customer from the very beginning. The computer of the National Insurance Office will be incorporated into the Centre.

* Ken Jones (NR03), pp. 61ff., and (NR06).
** Lønns-og prisdepartementet (NR02).

2.3. DENMARK

The development of automation in the Danish public administration is characterised by the automation of relatively few but important routine applications. Major data bases are being set up in support of taxation, population registration and car registration. Of special interest is the car register which permits remote access, as well as the present operation and future development of the Central Population Register which might eventually lead to the integration of personal files in various branches of the Danish administration.

The Central Register of Motor Vehicles contains data on all Danish motor vehicles (about 1.5 million units). At first this register was kept on magnetic tape for taxation purposes only. Since 1968 it has been placed on 3 IBM data cells. It is handled by Datacentralen, the Danish DP Centre, where the major part of state ADP applications are concentrated *. A total of about 145 terminals are connected to this system, which is available 24 hours a day.

The system is designed to serve a wide range of tasks, some of them being carried out by the state police offices spread over the country.

Among these tasks are:

- car registration;
- calculation, collection and control of payment of tax on motor vehicles;
- calling vehicles in for periodical inspection, with subsequent identification of any person who has not appeared;
- statistics;
- insurance matters.

Furthermore, it is possible to make direct inquiries concerning individual motor vehicles by giving the registration number of the car. Other entries into the register are not yet possible. The person number of car owners is not included in the register. An index of chassis numbers is to be built up. At present, if the car number is not known, the whole register has to be searched. This is done for abandoned cars without plates and for crime investigation purposes. Besides this, a separate file for stolen cars has been built up.

* For further details on Datacentralen see Willi Olsen (DK01).

From each police (motor car) office in Denmark and from different insurance companies it is thus possible to get information by telex from the register. The authorisation of the inquiring telex is checked. There are about 3,500 daily inquiries. It takes an average of 1½ minutes to receive the answer to a question. Nine different standardized answers are possible.

Population registration in Denmark has been carried out on a local basis since 1924. A Central Register of Persons (CPR) was implemented in 1968 *. Before its establishment the six regional data centres shared by the Danish municipalities already had punch card registers covering the greater part of the population. Thus it was relatively easy to transfer these data to CPR which is kept on magnetic tape and run on the installations of Datacentralen. The Secretariat for Registration of Persons, a department of the Danish Ministry of the Interior, is responsible for the system.

In connection with the implementation of the CPR, a person identification number was introduced in 1968. Its administration still seems to be the outstanding task of CPR. Person number certificates were issued to all persons registered, and are still issued when asked for. As no identity cards are issued in Denmark, these certificates are sometimes used unofficially for identification purposes. When they were issued in 1968 a large number of errors were discovered in the data content of the CPR.

The CPR is updated once a week in the following way. The CPR has delivered to the local authorities for each inhabitant a computer printed index card ("CPR card") containing all stored data. These cards form the local population registers. The local authorities are responsible for transmitting, on a tear-off part of the CPR card, all changes reported to them from the Danish church (births, marriages), the Courts (deaths, divorces), individuals (moves), etc. The tear-off part of the CPR card is sent to the regional EDP centre to which the municipality is attached. There, the changes are punched and the punch cards sent to Datacentralen.

Quite extensive controls of the data contents of the CPR are carried out. The local authorities are responsible for checking the validity of the information contained in the CPR. They examined the data content of the CPR systematically in order to increase its reliability as a basis for the 1970 census.

Up to 1970 about 45,000 errors in birthdates or sex had been registered, leading to the allocation of new person numbers. About 5,000 double registrations were found. The CPR contains a total of about 5,800,000 records.

Information from the CPR is given only to public authorities. However, private persons may get information on other persons'

* Henrik Nielsen (DK02).

addresses from the local registers. In connection with the updating of the CPR, changes are communicated weekly to the National pensions system (ATP), the statistical services, the conscription authorities and the taxpayers' file of the income tax system. The last-mentioned system has been newly designed in connection with a re-organisation of the taxation procedure in 1970. It provides separate registers of about 3,000,000 taxpayers, and of about 250,000 employers who are witholding their employees' income tax in accordance with a preliminary income assessment.

The Danish Ministry of the Interior is at present considering the changeover of the tape-oriented CPR to random access. The desirability of establishing a new independent system beside or instead of the old one, or the integration of the old one into the new system is being discussed *. However, up to September 1971 no choice had yet been made. Nor has there been any decision as to the opportunity of giving major users data bases of their own, identical to the CPR. Studies are undertaken to provide a basis for the assessment of information needs of the main users, as of 1975 **. It must be mentioned, however, that the six municipal data centres already have copies of the CPR for the municipalities they are serving.

2.4. BELGIUM

The Belgian National Register (Registre national, Rijksregister) has been implemented centrally, since 1968, by the General Administration Service of the Department of Public Administration (Ministère de la fonction publique)***. It is aimed at allocating a person identification number to all physical and legal persons in Belgium and to maintain a permanent inventory of information concerning these persons.

The National Register is being built up on the basis of information contained in the municipal population registers and registers of aliens. In 1956 it was made mandatory in all the 2,375 Belgian municipalities to keep such registers.

In a first stage, information is entered concerning the basic identification data of each person. Starting in April 1969, information on 6,200,000 persons out of a total of about 10 million was entered, and personal identification numbers were allocated by the end of 1971.

The implementation of the National Register is strongly influenced by the fact that there are no legal provisions concerning population registration at national level, except for aliens residing in Belgium. A Bill seems to have been drafted but not yet submitted to Parliament.

*Nyt CPR (DK03).

**Den Kommunale informationsstruktur (DK04).

***The National Register is described by J. Vandendries (BE01), J. Barthélemy (BE02 and BE04) and J. Debertogh (BE03). See also Ake Pernelid (AA11), pp. 40f.

As long as such a Bill is not voted, the National Register cannot become fully operational.

This being so, the National Register cannot yet promote information exchange among branches of central government administration. Currently, emphasis is given to rendering services to local authorities for the following reasons:

In the absence of a national law the National Register can be built up only in co-operation with the local authorities which provide the data to be entered. As there is no possibility of forcing the local authorities to co-operate, a certain number of advantages had to be offered to make the system attractive. Contracts have been signed with about 2,000 out of the 2,375 Belgian local authorities. They define the kind of data to be stored in the municipalities' interest in addition to the minimum set of data, consisting essentially of name, birthdate and address. In these contracts the National Register undertakes to perform all the tasks which the local authority may desire and which can be performed from the stored data (listing of inhabitants by street, age, etc., address lists), free of charge (except for paper, mailing or telecommunication costs).

It may be assumed that this situation has had an important effect on the implementation of the National Register which, except for the updating by tele-processing, is partly operational and performs some fairly sophisticated operations which are described below. It has been felt necessary to show, at a relatively early stage, some possible applications in order to convince the local authorities of the usefulness of such a system. Those local authorities which have not yet signed a contract with the National Register are either small ones or for cities such as Antwerp with data processing installations of their own. The absence of significant installations at the municipal level may also be partly responsible for the success of the National Register.

The National Register is built up with information on physical persons contained in the municipal population registers. The municipal population registers continue to exist alongside the National Register and to serve for person registration, distribution of drivers' licences, inquiries, etc. For small communities there is an obligation to keep them in bound books. In those communities where paper cards are used these cards are sometimes printed directly by the National Register.

All information to be entered into the National Register must be coded manually either by the municipality or by the National Register Service. Lists have been established with codes for more than 600,000 names, 50,000 first names, community and street names. As for the name codes, the whole list fills several thick volumes. An abridged version is printed and sent to those municipalities which perform the coding themselves. The stated advantages of such codes lie in a reduction of error rates and more compact storage. Further, it is stressed that in this way all names can be spelled exactly (e.g. making a difference

between "de Vries", "De Vries", "Devries" and "DeVries") - essential if the National Register were to serve later for the distribution of identity cards.

However, this view calls for some criticism. The technical feasibility of using machine codes which make it possible to distinguish between small letters and capitals and to include some additional special signs (accents, etc.), for the National Register, will not be discussed here. Yet it must be pointed out that data entry and updating actually require a fair amount of skill on the part of the user of the system, and that teleprocessing requires all code lists to be stored on discs if updating and inquiries by less qualified personnel in small communities are to be performed in clear text. Moreover, it seems that the manual codification entails some errors. These are corrected in some cases by checking the printout of the National Register delivered to the local authority against the content of the local population register. No statistics are available on errors encountered.

The updating system of the National Register is the same as for the Danish population register. For each person registered a card is printed and sent to the local authorities. Changes are written on a tear-off part of the card. This card is then sent to a regional office of the National Register where the information is coded and transmitted via telex to the National Register. There it is first recorded on punch tape and then transferred to magnetic tape. However, for municipalities connected to the telex network, on-line updating via telex will be available by 1972.

In some cases the updating information generates the updating of linked records, e.g. the report of the death of a man changes the marital status of his wife from "married" to "widow". At present this is a possible source of confusion, as a new paper card concerning the wife is printed out and sent to the municipality where the old card still exists.

The uses of the National Register that are already being made or are envisaged may be divided into uses by local authorities and those by central government departments or agencies.

The National Register is operational for inquiries from the co-operating local authorities, either on-line or off-line. Part or all of the information on a physical or legal person contained in the Register may be printed out after indication of the corresponding identification number. In addition, searches by name including homonyms may be made.

Electoral lists, lists of school children etc. have up to now been printed only occasionally despite the advanced stage of implementation of the Register. The city of Brussels has been provided with lists of inhabitants by age and street for locating new schools and for town renewal purposes. By the end of 1972 a catalogue is to be published

indicating all operations that might be performed on behalf of local authorities.

Only one case of use of the National Register by a branch of the Central Administration is reported, namely on-line inquiries performed by the aliens' police under the direction of the Ministry of Justice. It is stated that this application does not presuppose legal provisions permitting it.

A certain number of agencies are already taking an interest in the possibility of using the National Register and the personal identification numbers but it is unlikely that further action will be taken before a law is passed. Until then, no data is exchanged between the National Register on the one side, and other agencies. However, the possible use of the National Register as a basic register for public administration as a whole is already being considered by the "Commission interdépartementale d'automation" which is assisting the Ministry of Civil Service in charge of promoting automation in public administration. As to the plans of this Ministry, the National Register is to serve later as the basic person and business firm register for the whole central administration. A similar register for real estate units is being considered.

The National Register is run on a duplex Siemens 4004/45 system. The register is stored twice, on tape and on magnetic cards or discs. The total operating costs of the National Register are estimated at B. Fr. 60 million per year. No cost/benefit analyses have been made and the system is not expected to have a financial short-term payoff.

The data on random access storage media are accessible by telex for inquiries and, later on, for updating. Only a few local authorities are making use of the on-line inquiry facility offered. Among these is one small community of only 2-3,000 inhabitants. All telecommunication costs are charged to the local authority concerned. Local authorities will be invited to share leased lines from the centre to regional multiplexers which could be used with transmission speeds up to 9,600 baud.

The question of decentralising the National Register in order to meet the growing demand for services to the local authorities has been raised. The establishment of regional centres is being considered. They would get that part of the content of the National Register needed to produce tables, listings, etc., for the local authorities of the region served. The question of whether updating and answering of inquiries should also be carried out later at regional level is a controversial one. The administration of the National Register advocates a centralised solution, mainly for technical reasons.

2.5. GERMANY

For Germany, the discussion of ongoing developments in the field of advanced automation is far more complicated than in the

countries mentioned earlier. This difficulty is not mainly created by the size of the population of the country, but by the complexity of its political and administrative structures.

In Germany almost all administrative tasks are carried out either by the States or by local authorities. The Federal Government has few administrative tasks. However, the Länder administrations often execute Federal laws and, in such cases, the Federal Government has considerable power to regulate Länder administration, in the same way as the Länder may do so with local administration. The administrative units at the various levels co-operate among themselves and with units at other levels, very closely and frequently, to an extent that is unknown in other federal political systems.

Despite the complexity of these structures, some observations are made here with regard to population registration in Germany. Developments in this field are of particular relevance to such issues as administrative centralisation and other organisational condequences of integrated data bases as discussed in Part Four of this report. Advanced forms of automation in other sectors, especially statistics and law enforcement, are not reported here *.

At present only a few population data bases exist at local level, some of them permitting random access. They are used to support routine tasks carried out by different branches of local administration. However, due to exisiting administrative structures, the potential for future developments, in both size and complexity of organisational integration, seems high.

Germany already has a fairly sophisticated non-computerised reporting system for the whole population (Meldewesen). Since 1945, it has been based on Länder laws and is being administered, in most of the Länder, by the local authorities. Each person changing residence has to notify the local authorities' registration offices (Meldebehörde) or, in some Länder, Land police offices, of both his old and his new address.

The manual population registers (Melderegister) thereby created serve for police inquiries, address inquiries made by individuals, the issuance of identity cards and several other certificates and notifications. It must be emphasized that long before the computerisation of administrative registers could be discussed, the aims in keeping such registers shifted from police purposes only (by keeping track of persons) towards the regular provision of up-to-date population information for a wide range of administrative units and departments even permitting the discontinuance of special registers ** . Several municipal registers serving e.g. the issuance of preliminary tax assessment forms for income tax withheld by the employer (Lohnsteuerkarten), electoral lists,

* For the development of data bases for supporting urban and regional planning see Paul Kenneth and Claude Maestre (AA22).

** Runderlass der Reichsinnenministers zur Reichsmeldeordnung vom 6.1.1938 (10.4.1938), quoted in Hertel (GE12), p. 11.

vaccination lists and municipal statistics are regularly updated manually with information from the population registers (Melderegister).

The possibility of automating these registers and melting them into an integrated data base has led to growing awareness of the importance of the Melderegister in providing the greater part of population data which administrative agencies may need.

On this basis several cities developed population data bases where the residence address items are being kept at random access while the other data are mainly stored on magnetic tape. These data bases contain only a part of the information in the Melderegister which continue to be kept manually in the same way as before. A disc-oriented system was developed by the city of Augsburg and AKD (Arbeitsgemeinschaft kommunale Datenverarbeitung), an association of cities and counties in the State of North-Rhine-Westphalia. This was adopted by several cities *. Although it permits random access it is at present hardly used for individual inquiries or provision of data for planning purposes. It serves routine tasks in the fields of taxation, electoral lists, school attendance, etc., much in the same way as tape-oriented systems that were used before.

The system developed by Augsburg and the AKD is designed in such a way as to permit future integration of other files. However, present developments are not leading towards a step-by-step upgrading of existing systems at local level. Due to the imminent introduction of a uniform federal person identification number, a trend can be observed towards creating, in connection with the distribution of this number, large remote access systems handled by joint municipal or municipal/Land data centres and greatly influenced by common Land or even federal standards, though still under the administrative responsibility of local government.

The approach adopted by the Land of Hesse may serve as an example. Some remarks on the development in the Land of Rhineland-Palatinate where implementations seem to be fairly advanced, may complete the picture. In this Land the administrative context to some extent differs from that in the remaining Länder.

In the Land of Hesse, the joint Land/municipal Computer Centre (Hessische Zentrale für Datenverarbeitung, HZD) is developing a uniform solution for the automation of the Melderegister and other population registers which are, and will be, kept by the local authorities. This is done in co-operation with the regional municipal data processing centres established in the Land of Hesse (Kommunale Gebietsrechenzentren, KGRZ). The stated objective is to permit integrated processing of population data of relevance to all administrative levels (local, county, Land) and the implementation of a unique (but not necessarily physically centralised) data base **.

* IBM Deutschland (GE01).

** Automation im Einwohnerwesen (GE03), cf. also (GE05) and (GE09).

A standard population information record has been defined. It contains more information items than the existing computerised records, and more information than is at present contained in the Melderegister. This should later on permit the discontinuance of several manual registers at present kept by the municipalities.

In 1972 the system will be tested in several pilot areas from which data have already been checked and entered. After these tests and the formal release of the programmes, the implementation of the system will be transferred from HZD to the KGRZ, where local authorities willing to join could then apply. There are plans for subsequent experiments with teleprocessing.

In the unified population information record an internal person number is already being allocated to every person about whom information is stored. This number has the same composition as the federal number which is scheduled to be introduced by 1975 *. The numbers already allocated to persons will be kept as the federal person identification numbers of these persons.

Besides the population record file and certain sub-files and index files, a separate file will be created containing the set of data defined by the draft law introducing the federal person number, necessary for the allocation of the person identification number. The responsibility for this allocation will be with the Land authorities. It can be guessed therefore, that keeping such a file will be the responsibility of the Land. No provisions appear to have been made to erase these files after the effective allocation of person numbers to the whole population.

The population register in the Land of Rhineland-Palatinate is at present being implemented, and will be operational in 1974 **. A central data base is being created at the Land Computer Centre. It will function as a service to different administrative units and departments, without leading to changes in their jurisdiction and responsibility.

Unlike the situation in the majority of Länder in Germany, in Rhineland-Palatinate the Land police administration is in charge of the Melderegister, except for some cities where the police is a local affair. As in the other Länder, the performance of mass routine work such as the establishment of electoral lists, etc., is under the jurisdiction of local government. Starting in 1971, Land police registration offices and three municipalities are connected via terminals and leased lines to the system permitting decentralised performance of mass routine work for the municipalities and remote inquiries. The Land criminal police headquarters is also connected for the purpose of searching for wanted persons. The system starts with teleprocessing right at the outset and will be available for police purposes around the clock.

The population record holds a similar amount of data items as that of Hesse. The future federal person identification number is already

* Entwurf Bundesmeldegesetz (GE11); Bundesminister des Innern (GE10).

** Joachim Stöckle (GE02).

used in the same way. Besides, and mainly for police purposes, the register may be searched by name, in both literal and phonetic spelling.

The federal draft bill already-mentioned on registration * is playing a key role in these developments. This bill aims at setting federal standards in the field of population registration, especially with the allocation of the federal person identification number, in order to promote the exchange of person-related information among administrative units and departments.

The person identification number will be allocated by the Länder on the basis of a standard set of data defined by federal law and centrally stored in each Land. This set of data must not be confused with the set to be entered in the main population registers described above. It contains only basic information for the unambiguous identification of the persons to whom person numbers are attributed. However, in some Länder(North-Rhine-Westphalia ** , Baden-Württemberg***)there are projects to include residence addresses in these registers which could then serve to provide these addresses to all branches of public administration that may need them. It is stressed that this will not result in copying the (local) Melderegister at a higher level, as the registers built up for the allocation of person numbers contain only such data items as name, date and place of birth, sex and eventually residence addresses.

The federal Act will be completed by Land Acts which follow a model draft bill elaborated by a task force appointed by the Länder ministers of the Interior ****. These uniform Länder acts will regulate details such as the transmission of data records among offices in case a person moves. They will furthermore contain regulations on inquiries made by individuals, where there will be, in principle, no restrictions, as far as information on names and addresses only is concerned. The ways in which the considerable implementation problems resulting from the situation just described could be best met are, at present, the subject of discussion among the different government levels. The potential for further administrative integration is generally stressed, but some concern over the centralising effect of the introduction of federal standards is also expressed.

No exact figures as to the costs of the allocation of person identification numbers and the implementation of computerised population registration systems seem to be available. However, the data preparation and data entry costs for a single population record are estimated at D.M. 1.15 - 2.15 for Hesse. Updating costs will probably be fairly high as about 40 per cent of the records must be updated per year *****.

* Entwurf Bundesmeldegesetz (GE11).
** See (GE20).
*** See (GE21).
**** Entwurf eines Musters für ein Landesmeldegesetz, June 1971.
***** This figure refers to the city of Düsseldorf.

Further plans in the field of population registration concern a country-wide network linking the different State systems and the definition of a federal standard population data record for all local or state population data bases. These plans are being elaborated by a joint federal state task force.

2.6. SOME REMARKS ON OTHER COUNTRIES

This section contains brief remarks on ongoing data base developments in other European OECD Member countries that have not been studied to the same extent as the five countries already mentioned. Of special interest are the developments in Finland, France, Luxembourg and the Netherlands. The situation regarding population registration in the Netherlands is shown clearly in an OECD report *, so no additional remarks are necessary here.

FINLAND

In Finland, several large computerised administrative registers are being planned or developed by the Finnish State Computer Centre in co-operation with the agencies concerned. These registers are at present being stored on magnetic tape. The Finnish State Computer Centre (FSCC) is active in planning new registers and in promoting the adoption of general codes and identifiers as well as the conversion of existing registers to remote processing with a view to integration in the state administration **.

FSCC was founded in 1964 to ensure effective co-operation in the use of existing ADP equipment in the different government departments and institutions, and to advise and assist them on questions relating to ADP. Much like Datacentralen in Denmark, FSCC operates on a service bureau basis, also serving the private sector. Customers have to pay for the services rendered by FSCC.

Of the existing centralised registers, the central population register and the car register deserve mention. Other central registers currently stored on magnetic tape are a business register and several registers used in connection with taxation. A real estate register is being planned and a driver's licence file is becoming operational in 1972.

A central population register is being developed. It will be partly operational in 1972 and fully operational in 1974. The register, administered by the Population Registration Centre, contains a person file

* G.R. Pipe (13).

** See (FL01). An extensive description is also to be found in G.R. Pipe (13).

and a real estate file. A person identification number and a real estate code will permit the exchange of data or the combination with data from other registers.

The present car registration system was adopted in 1966. Primarily it serves registration, taxation and statistical purposes. Data in machine-readable form are supplied regularly to the defence forces and to insurance companies. Statistics and lists have been compiled from the register for regional planning purposes and for the private sector. It is planned to supplement the system with the person numbers or business codes of car owners. The register is stored on magnetic tape, but its conversion to random access storage media is being considered. In 1971, remote inquiry experiments were carried out on it.

It is planned to make all registers suitable for remote inquiry and updating by 1976. This should subsequently lead to a centralised system of integrated data bases operated on FSCC computers. This solution is deemed economical in a country the size of Finland. It is estimated that a total of about 1,000 offices will be equipped with terminals.

FRANCE

In France, the " Délégation à l'informatique" co-ordinates data base projects of various administrative departments. Of particular relevance is the establishment of basic population and business registers as well as several data base pilot studies.

The "Institut de la statistique et des études économiques" (INSEE) is carrying out two projects: "SAFARI", introducing a standard person identification number and "SIRENE" developing a standard business firm code. The "fichiers de référence" thereby created will be completed in 1973. They aim at the subsequent integration of administrative registers by introducing person numbers and business firm codes into them. These numbers or codes are also to be used by the private sector.

"SAFARI" is based on the existing population register of INSEE. INSEE registers each birth from the birth certificate and gives the person a registration number. As the register is written by hand the registration number is not yet widely circulated or used, although some important public bodies, such as the Social Security authorities, use these numbers.

"SIRENE" is a similar exercise concerning another category of units: firms and institutions. INSEE has a register of firms and institutions which is partly manual and partly mechanised and is modernising the management of this register so as to make it available to administrations needing it.

The standard business code will be used in a data base for economic statistics which is at present being implemented by INSEE. The interministerial project "ENEIDE" (Ensemble normalisé sur les entreprises industrielles pour les décisions de l'Etat) aims at simplifying the exchange of information between administration and industry. By integrating 15 different registers, such as customs statistics, international trade statistics, register of industrial and commercial benefits, etc. it is hoped to avoid putting the same question several times. Thus it will be possible to collect valuable economic information in a single file. This will allow economic trends in the whole country to be followed, obviating or at least cutting down the frequency with which returns have to be made for industry or trade. This system is scheduled to become operational in 1975.

Still in the field of economic information another project is aimed at equipping the regional "economic observation units" (Observatoires économiques régionaux, OER) with modern data processing techniques. The work of the economic observation units is to collect economic information from within the whole of the administration, in order to put it at the disposal of the public, or the different administrations themselves.

The main objective of these services (there will be 7 OER for France in 1975) is to support diffusion of social and economic information at regional level, using modern equipment for compiling and editing data, and giving all users of public and private sectors facilities for finding, in the same service, economic information evaluated and correctly interpreted according to their needs. This information may concern regions other than that in which the service is located, and the "Observatoires" will be interconnected.

Finally, a pilot project preceding the establishment of a data base covering the whole of France deserves mention.

A driving licence system is being developed jointly by the Ministries of the Interior, Finance and Justice. It aims at integrating the issuance of drivers' licences and the registration of traffic offences. The creation of a unique file common to all users was at first envisaged, but later on it was decided to separate the file containing traffic offences from the driving licence file, for reasons of privacy protection. However, both files will make use of the standard person number for common identification.

The Paris Prefecture of Police was assigned the responsibility for this project, which will be first implemented in the Paris area and then extended to the whole of France *. The system serves the Ministry of the Interior, responsible for issuing driving licences, and the Ministry of Justice, which will have to make use of information collected by the former. Each has its own terminals. Those installed in the Ministry of the Interior serve the purely administrative function of managing the

* For further details see Thiébault (FR05).

driving-licence file; those in the law courts enable the administrative file to be questioned, and to add any necessary notes or comments.

Furthermore, the Act establishing the data base * institutes a system of insurance penalties based on fines and sentences imposed by the courts. Drivers are assigned a number of penalty points depending on the nature, seriousness and frequency of any major offence which is committed. The insurance companies may be informed only of the total number of points thus assigned, and have no access to the details of assessment. The points will be used as a basis for raising the insurance premium.

LUXEMBOURG

Luxembourg is planning to introduce a person number and to develop a basic population register containing only a few data items. An "Avant-projet de loi organisant l'identification numérique" is being considered. The planned population register does not aim only at permitting the integration of administrative registers by introducing person numbers into them, but at sorting addresses and providing them to all branches of administration that may need them. This is an intermediate solution between the French "fichiers de référence" and the Belgian National Register or the population registers in the Scandinavian countries.

* Loi sur le fichier des conducteurs, of 24th June, 1970, the main lines of which are exposed in Braibant (FR04), pp. 9ff.

Part Three

CONSTRAINTS AND CONDITIONS FOR SUCCESS IN IMPLEMENTING INTEGRATED DATA BASES

3.1 GENERAL REMARKS

The situation at present encountered in the countries described may in most cases be regarded as the implementation stage of large-scale but relatively unsophisticated data bases for routine administrative operations. These data bases are generally designed in such a way as to support several such operations, themselves mostly computerised; income taxation and individual inquiries for population data, car registration and car insurance checking, cadaster and land register may thus be linked. To speak of integrated data bases or to describe them as parts of integrated data processing systems, as defined above is therefore justified.

The development of such integrated data bases seems to be a logical sequel to the efforts put into the automation of administrative routine tasks for more than a decade. They provide administrative routines sometimes automated long before with common data storage.

Yet there is a general feeling that such integrated data bases might constitute a qualitatively new step in the automation of public administration. This feeling has been expressed in the literature dealing with the Data Bank concept *. It also constitutes something like a "working philosophy" of some of the systems being developed ** . However, its justification has never been tested up to now, as the "data bank" concept did not lead to notable success.

This being so it seems useful to draw some inference from the data base experiences in the countries described. The term "data bank" is often still employed for these experiences, but is understood rather in the sense of "integrated data base" than in the current (American) sense of the term "data bank".

These inferences can be divided into two groups:

* See Thomas (AA15).

** Notably in the Swedish Land Data Bank Project, see Helmer Wallner (SW25) and (SW27).

- Conditions for success in setting up integrated data bases, or, put negatively, constraints on the development of integrated data bases.

- Impact, or consequences, of integrated data bases, on structure and social functions of public administration.

Before going into details one should perhaps ask whether it is satisfactory to state the problems related to present data base development in terms of conditions for success, or constraints, and of impact or consequences. Such an approach might be feared to lead to the potential of information technology being considered as an independent factor with no reference to the question of whether a given society has any reason at all to make use of this potential.

It goes without saying that a policy view of these problems must come to grips with the problems in a wider context so as to ensure that beneficial use is made of available technologies. However, policy decisions also need to be supported by fact-finding approaches which provisionally abstract from some important issues the better to detect other problems. This is an important prerequisite for assessing the desirability of introducing advanced forms of automation. It does not mean that "the capacity of new tools to transform human and political affairs is treated as a virtually irresistible force" *.

Such a restricted fact-finding effort can provide certain elements for policy appreciations but it is not a substitute for such appreciations. Those elements could be of some use where attempts are being made not to be dependent on the pace of technological change. There is no reason to implement the potential of information technology fully if there is no economic, political or social justification for doing so.

Issues relating to impact on the structure and social function of public administration will be dealt with in Part Four of this report; what follows is an attempt to identify some of the conditions for success and constraints of relevance for the development of advanced automation. Several main sets of such conditions and constraints may be identified; they may be political, organisational, economic or technical. Of these, the organisational and economic ones will be the centre of interest.

The technical conditions for the successful implementation of integrated systems are not discussed here. Information is to be found in a previous publication in the series "OECD Informatics Studies" **. It may be mentioned briefly, however, that even if there is no fundamental technical obstacle to building up integrated data bases, some technical conditions are often still only possibilities, not realities. This is especially true of generalised data base management systems ***

* Westin (07), p. 149.
** Thomas (AA15), Chapter 4.
*** See the CODASYL reports (14 and 15).

and high-speed data transmission *. In the design of the data bases encountered it has often been found that the capacity of mass memories still limits the possibilities of direct access systems. Sometimes this leads to increased efforts towards more sophisticated data organisation patterns so as to reduce requirements for storage capacity.

3.2. ADMINISTRATIVE ORGANISATION

The factors deciding the successful development of the systems described seem to be mainly of an organisational or an economic nature. The developments described above may easily be summarised by stating that the main condition for their success is or will be the quality of the administrative structures already in existence.

The general impression is one of relative success in developing first steps towards integrated data processing. These may be sophisticated with regard to the analysis and design of organisational structures, but not in the sense of a very advanced use of the latest computer and data transmission technologies.

Most approaches are along the lines of the current thinking developed in the United States since 1968 in criticising unsuccessful attempts to develop large urban or regional information systems. Such criticism suggests that a start should be made by implementing basic operational components of urban information systems ** and taking care not to impose "upon a local government's operationally grounded information system an 'extra-organisational' information system". "No municipal or urban information system will be maintained on a dynamic basis unless it is an integral part of a system that has at its base the satisfaction of operational requirements of local government agencies..." ***

While it seems that such an approach is now taken seriously in the United States, it may be said that with considerably less theoretical involvement and almost imperceptibly this approach has already prevailed in some of the countries described above.

The political context and the attitudes of administrators

The organisational conditions for success cannot easily be separated from the attitude of administrators and the public and thus from the political context of the developments described. Several factors seem to play an important role.

* See Dieter Kimbel (17).
** Weiner, in Westin (07), p. 341, see also Mitchel (AA24).
*** Weiner, p. 342.

First of all, it may be asked to what degree relatively satisfactory development is due to the special situation of public administration in continental Europe, with strong traditions in the civil service. These traditions have brought about a high degree of homogeneity in administrative action and language, and in the attitude and thinking of administrators. Despite the departmentalisation of administrative organisation, a common ground for introducing automation may therefore be found more easily than in administrative environments of a different nature.

With regard to the Scandinavian countries, another important factor may be the relatively stable and harmonious relations between State and citizens. This may be largely responsible for the common acceptance of population registers and person identification numbers in these countries. The role of the State in supplying a wide range of services seems to be commonly accepted and the necessary tools for doing so are provided.

Where Sweden is concerned, a further important element is no doubt the principle of publicity of government records which permits every citizen to see each record not expressly declared secret by law. Even if this principle is questioned at the moment because of increased fears of invasion of privacy, its importance in developing an open-minded attitude towards data exchange must not be underestimated. To the observer, it looks as if the permission to release information outside public administration is at the same time responsible for the high level of data exchange among the different branches of public administration.

Still with regard to Sweden, it may be mentioned, too, that the person identification number was introduced in 1947 - thus before administrative tasks were automated. The person identification number already serves as an index to several administrative registers *, and Sweden seems to be the only country where it is generally utilised, not only by public administration but also private enterprise.

Finally, in all Scandinavian countries financial considerations are of crucial importance. Some of the implications of such a situation will be dealt with below.

It must be pointed out here, however, that the strong financial pressure leading to short term payoff considerations and the need to justify each new computer application in government may be partly responsible for the great care with which automated systems are being implemented. This strongly indicates that in the Scandinavian countries, the mere appeal to computer technology has lost its persuasive power, and that in decisions on government applications policy questions prevail over purely technical considerations.

Such attitudes lead to a more realistic assessment of the potential benefits of integrated data bases. A certain constraint upon their

* Salomonsson (SW32), p. 23 provides an overview.

development may be seen in the fact that some of them, especially the Swedish Land Data Bank, were conceived not only for operating purposes of public administration but also as a support for urban and regional planning. As it became obvious in recent years that important research would first have to be done before an integrated data base could fulfil the requirements and data needs of urban and regional planners, this may have led to a somewhat slower development in terms of financial priorities than the promoters of such integrated data bases might have wished.

More generally, the necessity to show tangible results plays an important part in the success of implementations. In another context, this can be experienced in the Belgian National Register, where in the present building-up stage municipalities have to be offered certain services from the register in order to convince them to join.

On the other hand, several constraints stemming from the attitude of administrators towards computer technology in almost all the countries described must not be overlooked. It is frequently pointed out that lack of training and understanding of the personnel constitutes a serious constraint in those administrative departments which automate their work. This is particularly relevant when systems development and operations are carried out on a service bureau basis, e.g. by Datacentralen in Denmark. The centralisation of know-how in such data processing centres is seen as a problem; in Denmark this has led to important training efforts in the remaining parts of public administration * , and, in other countries to transferring people from the data centre into single agencies for which systems are being developed. Especially in Sweden and at municipal and state levels in Germany, many administrators can be found who are acutely aware of ADP problems. In these countries, most work in analysis, systems design programming and operation is carried out not by outside organisations or government service centres but by administrators who have had subsequent ADP training. This ensures a good understanding of the particularities of a field which is being automated and may also constitute an important factor for success.

Existing administrative structures

Probably the most important conditions for implementing integrated data processing systems successfully are the quality of the existing administrative organisation and of manually filed data.

In Sweden, it is frequently stressed that computer applications are relatively modest and the amount of manpower invested on systems development is fairly low. On the other hand administrative procedures are carefully elaborated; the entire data stream engendered by administrative processes is taken into consideration, not only the parts of that data stream that are going to be handled by computers.

* Rømer, Morgens D., (DK05), pp. 6FF.

It may be doubtful whether such careful investigation of administrative tasks from the point of view of information flows existed before automation made it necessary. Public administration is generally not accustomed to consider its own work in organisational or economic terms. But the importance of such investigations was soon recognised. Both routine automation and integrated data base development had a very beneficial effect in all countries described, in that systems analysis helped to make public administration more aware of itself. It very soon became clear that a thorough analysis of the functional organisation of its day-to-day work was a prerequisite for the efficient use of computer technology. It has been recognised in many cases that the use of the computer as a simple tool, such as a typewriter, did not help much, and that a thorough investigation of the whole administrative process was necessary in order to find the best solution. Such a comprehensive analysis is often carried out not by professional systems analysts but by public officials with some training in data processing and organisation analysis.

An analysis of this kind is being or has been performed in all Swedish data base projects reported, and its importance is very frequently stressed by the project leaders. Similar efforts can be found in Denmark, where the information structure of a medium-sized local community is being studied thoroughly *, as well as in other countries.

As has been mentioned already, sophisticated patterns of data exchange contribute a great deal to the quality of existing administrative structures. Such patterns are particularly well-developed in Sweden, where many registers exchange their data and where, to a great extent, the Central Bureau of Statistics obtains statistical data from operative registers.

Another example can be found in the well-developed system of data exchange and reporting duties connected with the "Meldewesen" in Germany. It is much easier to provide for common data storage for several administrative processes if these are already linked by regular manual data exchange. Otherwise, such exchange patterns must first be developed and the corresponding attitude of co-operation among various departments or agencies must be created. In that case, the change brought about by the introduction of a computerised system with some integration effect would be much greater and the underlying organisation and the administrators involved might not absorb it easily.

In this context still another factor deserves mention. In Sweden and in Norway, two functionally interrelated activities were, in some cases, entrusted to the same agency as it became clear that automation could have an integrating effect. This led to population registration being entrusted to the Central Bureau of Statistics in Norway and to a special agency concerned with income taxation (CFU) in Sweden.

* See (DK04), (DK08) and (DK09).

Quality and standardization of existing files

An important factor, in addition to the quality of functional organisation, especially data exchange patterns, is the quality and reliability of existing non-computerised files. As an example, population information in Sweden and Norway is checked not only as to its consistency but also against other files which might have led to concern over possible violation of privacy in other countries. In the Scandinavian countries statistics on the frequency of errors encountered in population registers are generally available. It is sometimes stated that the error rates were higher than expected. During the implementation of the Norwegian population register errors encountered in the manual or punch card registers to be transferred to magnetic tape led to an unforeseen amount of work, although the quality of the existing registers could still be considered as generally good *.

In Sweden, the Central Bureau of Statistics has compared its own register of the total population with county population registers in order to establish the error rate in its own register and to correct it. The only information item where a significant error rate (3.5 per cent in one case, 0.4 per cent in another) was found was the postal address **.

It is a common feeling among administrators, at least in the Scandinavian countries, that the quality of data has not been given the attention it deserves, and that as a consequence public officials should pay more attention to the related questions than, for example, hardware procurement.

The requirements for good quality in data and files will be still higher with random access storage systems permitting or leading to the integration of data of different kinds. Concern over these issues can be found, for example, in the Swedish Central Bureau of Statistics. It is expressed in the following way:

"The need for information of high quality can be greater in an integrated system than when separate systems are used. Any errors in the primary material can have more far-reaching consequences through their horizontal dissemination. Information in an integrated system will serve several quite unrelated purposes, which also gives rise to different quality specifications.

"... the scale of quality control and correction routines is, in part, an economic question. The importance of having correct information should be weighed against the costs that arise in connection with controls and the correction of errors. It is difficult to make assessments of this kind, however, when there is no advance method of accurately determining the frequency, with which, and for what purposes, particular information will be used; but information should in principle be of good quality from the point of view of all the potential users. Probably it is

* Cf. also the figures given above in the case of Denmark.
** Cf. (SW13).

impossible in economic terms to eliminate all errors from data banks, but it may be necessary on the other hand to create effective systems for the speedy correction of the administrative consequences of the errors so that the private individual is not injured" *.

Quality of data does not mean that only certain maximum error rates are permitted. It implies another important problem which only integration brings to its full bearing, namely that of the semantic definition of data elements used in multiple administrative tasks of differing nature.

It is commonly recognised and accepted that data elements in a record should have a standard format, and that lengths and logical structures of records have to be clearly defined in a standard way. Less importance, however, seems still to be given to the fact that the meaning of data elements also has to be unequivocally defined. Data elements refer to objects. Such objects may be complex; they may consist of relations between other objects. It is not sufficient that these data elements refer to an object in an unequivocal way. First of all this object must be defined in the same way.

If such objects (relations) have a simple structure, e.g. the relation "married" or the object "date of birth", no specific problem arises. Many objects identified by machine-stored data have such a relatively simple structure, but this will change when computer storage of school records and health records is extended.

But even now there are considerable difficulties involved in defining the meaning of data elements referring to real estate or business enterprises. The development of a unique business registration code seems to be seriously hampered by the fact that a business enterprise may be defined quite differently for taxation, statistical or industrial relations purposes or for export licences. At present, this seems to lead to the development of basic registers concerning legal persons, not business enterprises. Such a register of legal persons is being considered in Denmark. In Belgium, it is part of the National Register.

In the real estate sector, it can be stated without any exaggeration that the integration of the cadaster and the land register being realised in Sweden would have been practically impossible, had not the basic understanding, or definition, of the "real estate unit" already been the same in both registers.

Still in the field of real estate data bases, very serious problems may also arise since the present registers to be integrated were developed in a predominantly rural environment.

This is reflected in the kind of information they provide. Their structure does not take into account new requirements of land use

* Rapaport (SW06).

regulations, construction and urban planning *. If a real estate data base has to furnish relevant information to support such activities, important research and development work will still be required.

Such requirements for data quality and definition of meaning of data elements become especially important when matching of different files, e.g. for statistical purposes, is considered. Important losses of quality may occur through the very process of matching if the single registers differ in data quality or if the meaning of the same data elements is defined differently in the different registers **.

This calls for efforts of standardization of the meaning of data elements which must be undertaken as early as possible in order to prevent incompatible registers from being developed.

Important facets of this problem are the centralisation effect *** which such standardisation would inevitably have and possible dangers or shortcomings resulting from a more formalised description of objects or persons which may become necessary when standardization the meaning of data elements.

3.3. ECONOMIC FACTORS

Whereas in the countries mentioned in Part Two there is growing awareness of organisational problems linked to the development of integrated data processing, the same is not always true in the case of the economic questions that may arise. Uncertainty seems to prevail as to whether economic justification should be sought for introducing advanced automation in public administration and in what way this should be done.

Economic factors may be important for successfully implementing integrated data bases. Combined with an awareness of the potential impact of advanced automation on the structure and functions of public administration, economic considerations have been found especially important in Sweden, and also in the other Nordic countries. Such considerations may often be experienced as serious constraints but they may play a crucial role in:

- getting an integrated data base successfully to work;
- ensuring that it works efficiently in the sense of increasing an organisation's general performance;
- putting the question of the desirability of large data bases at the

* Ostermann (AA08), p. 10.
** Rapaport (SW06), p. 57.
*** Cf. Part Four.

political level, by asking: "Who wants which services at what price ?"

It is not possible, however, to assess the real importance of such consideration in each of the data base projects reviewed. Therefore only certain statements of a more general nature can be made here, with an attempt to identify some cases where economic evaluations have been made. The general problems related to economic evaluations in a public administration environment are then pointed out briefly. This may indicate the kind and degree of such evaluations which would be desirable in order to give effective support to decisions aiming at the introduction of integrated data bases and the subsequent process of developing them.

Current practice

The most common procedure is an estimation of systems development costs and operations costs which is generally made at a very early stage. Such estimations are often highly hypothetical, as figures on accounted costs for an integrated data base with random access facilities on which estimations could rely are practically unavailable. Of some help are the cost estimations that are used to determine the annual budgets of agencies or task forces whose sole responsibility is to develop a system. These annual budgets are at the base of most of the figures listed in the case of Sweden.

The situation with regard to cost estimates is not good, as programme budgeting (PPBS) is only in experimental use in some of the countries described, and as public administration generally is not accustomed to evaluate and monitor details of its performance in monetary terms. If it is relatively easy to evaluate systems development costs and annual operating costs, it is much more difficult to assess the costs for initial data preparation and data entry, and for all kinds of work in connection with updating a data base.

If economic justification for a data project is sought, this is generally done by a comparison of the costs both of the present (manual or less automated) system and the system proposed. Savings are generally expressed in terms of decreased manpower costs.

Such a calculation is often performed in Germany with regard to automation projects at local or state levels * . The costs of two alternatives, "before" and "after", are estimated separately and then compared globally. True cost/benefit comparisons are not made, as performances are not taken into account. Sometimes such performance factors as increased speed of delivery of a service, lower error rates, etc. are listed

* Berlin, (GE07), Automation und Rechnungsprüfung (GE14).

as an appendix, and it is recommended that they should be decisive in the event of equal costs of both systems *.

Such a practice encounters strong criticism **. It has been stated that it may not justify new systems but only discredit the old ones, as there may be other alternatives permitting still better performances. There may even be other ways of producing the same effect more efficiently without employing computers at all, simply by investigating and redesigning the functional structure of an administrative process. But the main criticism is that the potential of integration is disregarded. This potential is given with machines that may serve many functions and that are not confined to a specific purpose. Experiments with automation cannot generally draw upon this full potential as they can cover only part of all administrative tasks to be automated. Therefore, they are necessarily uneconomical.

Some of the alleged shortcomings of economic evaluations are avoided in an evaluation of the "rationality" of the Swedish Land Data Bank that was made after the first period of its experimental use in the County of Uppsala ***. This evaluation compared three different levels of rationality characterised by different service performances made possible by different technical equipment and/or different degrees of integration. In order to get something close to a real cost/benefit analysis, the "rationalisation effects" in each case were measured by the actual and potential higher revenue from certificates issued on the registers. It was assumed that banks, mortgage institutions and other customers would certainly be willing to pay more for better delivery of land register certificates that would save them time and money spent elsewhere ****. A comparison of the system development and conversion (data entry) costs with these rationalisation effects indicated a short-term payoff in the case of a terminal-oriented system. In addition, the current operation costs, including manpower, in the offices making use of the system, are the lowest in this case.

The study just mentioned clearly recognises that despite some improvements such a calculation is still problematic. The benefits of new integrated systems arise in many separated organisations, and their influence on administrative processes, as well as on urban or regional planning processes cannot be assessed yet *****.

It may therefore be useful to identify some of the problems with which economic evaluations of automated systems in public administration are confronted. These problems are mainly related to the measurement of potential benefits and to the general significance of economic rationality in a public administration environment.

* Berlin, (GE07).
** Niklas Luhmann, (AA14), pp. 120ff.
*** Fastighetsdatabanken, Teknik och Rationalitet (SW26).
**** Fastighetsdatabanken, Teknik och Rationalitet (SW26), Appendix 1, p. 6.
***** As above, (SW26), p. 69.

Costs

As indicated by the current practice of economic evaluation, the main problem does not consist in assessing the cost of integrated data in public administration but in assessing the benefits resulting from their utilisation. However, the usual practice of comparing costs only is also confronted with certain problems in the identification and prediction of costs.

Cost identification is difficult in the case of indirect costs that cannot be allocated to individual activities or individual users on an exact basis. Such costs, e.g. joint operating costs, or systems development costs, are particularly high in computerised systems. They may be allocated in very different ways. The choice between alternative bases for the allocation of indirect costs is a matter of judgement and is largely governed by the purpose for which the costings are to be used *. Depending on the purpose, the same item may have several costs. The method of determining costs depends on the kind of decision to be taken. Cost figures should be determined in such a way as to be of most use in that decision. For example, if a computer installation has reserve capacity and an administrative routine is to be automated one might ask whether the cost prediction for the new computerised routine should include part of the operating costs of the existing installation, either on a prorata or a marginal basis.

The comparison of costs incurred in old and new systems supposes that the costs of the new system can be predicted with some degree of probability. Such predictions must be based on past experience with costs in comparable systems.

It may often be difficult to break down both the old and the new systems into the same cost items **. To do this, sufficient details of the new system must be known already. Therefore, it is not possible to make forecasts with any degree of confidence at an early stage in the design of a system. Generally, however, a decision on the viability of a project must be reached at this early stage. A possible solution is to carry out pilot projects such as the experimental use of the Swedish Land Data Bank, before taking the final decision to extend such a project to cover a whole nation. International comparisons with projects at a more advanced stage of implementation may also be of some help.

Another considerable difficulty with cost prediction is that it tends to be confined to data processing costs only, both for operations and systems development. This stems from the practical impossibility of assessing correctly costs incurred by the different administrative departments or agencies.

* Morris (02), p. 13.
** Morris (02), p. 17.

Cost prediction would certainly be easier if appropriate cost controls were carried out. If they are carried out at all, cost controls are often mere accounting exercises that are of only limited interest in measuring the efficiency of a computerised system. They are of no great use, therefore, when new systems are being planned. In order to permit the assessment of the correctness of initial cost estimates, cost controls must be carried out on the same base for cost allocation as are the corresponding cost predictions.

Benefits

The main benefits expected from new integrated data processing systems are avoidance of costs (especially for manpower), better service, improved security and reliability. Such benefits are nothing more than some of the main positive consequences of integrated data processing on the structure and function of public administration, seen from an economic point of view. It is obvious that it is difficult, if not impossible, to quantify and express most of them in monetary terms.

Cost savings related to manpower is the only factor that may be quantified with some degree of exactitude. This has often led to manpower savings being regarded as the overriding criterion for rationalisation in public administration. If cost/cost comparisons or cost/benefit analyses are made and weighed, non-quantified factors are at best listed as an appendix. Therefore they are often simply disregarded.

However, even expected manpower savings are very problematic and do not always justify the introduction of a new system. Anticipated manpower savings are often not realised, since in many cases it is not possible to save part of a job; the result may merely be a smaller workload for parts of the personnel.

On the other hand, several intangible benefits may stem from the substitution of manpower by computers. Examples of these may be reliability, lower error rates, independence of changing motivations of the personnel, more capacity for coping with top-load work periods and lower growth rates of manpower budgets in the coming years.

In addition, the changeover to integration is not likely to entail as many manpower savings as did the first steps towards automation of large routines in the social security or taxation field. The integration of hitherto separated administrative functions may often lead only to increased quality of service, and the slight manpower savings may be cancelled out by increased workload.

It seems appropriate to treat other potential benefits than manpower savings in a conceptual framework more oriented towards administrative organisation - not in the context of quantitative cost/benefit analysis *.

* See below, Part Four.

However, several of the problems of quantifying and measuring some of these benefits, or impacts, may be shortly mentioned here in order to stress the difficulties encountered in trying to apply economic considerations to public administration. Reference is made to two kinds of "benefits": improved service and improved information for decision-making.

Improved service may often mean a saving in external costs incurred by the users of that service. It is not possible to quantify improvements in citizens' well being; but it might be possible (though fairly difficult) to measure the time spent in queues waiting for a service, or the speed of delivery of a certificate. This time may possibly even be calculated in monetary terms. Theoretically the value of the time of citizens who stand in line waiting for service may be compared to the value of the time of a clerk who is servicing them. But the value of time in both cases would first have to be assessed; this implies political considerations. In any case, preoccupation with these kinds of questions would probably lead to the recognition that in many cases higher administrative efficiency has been reached only by shifting costs and inconveniences to the user.

Still more complicated is the problem of evaluating the benefits stemming from better information. This would presuppose a measure of the value of information, the development of which would involve very considerable problems.

Information does not have any value per se, but only in the way it is used. To see how it is used seems impossible in the case of integrated data storage where the possible uses cannot be determined beforehand.

It has been proposed that the value assessment of information should be looked upon as a three-step process * :

- Information must have a surprise content which can be assessed only on a probability basis;
- it must lead to an action that would not have been made otherwise;
- this action must result in a higher payoff (benefit).

The measurement of any of these three steps seems possible only for highly formalised decision-making processes which may be encountered in the routine work of public administration. This might well lead to assessing with some degree of confidence the value of data stored in an integrated way for those routine processes for which they are designed right from the beginning. But the potential of integration

* J. Emery, "The Economic Aspects of Information" in (03), pp. 39ff.

residing in the indeterminateness of the use of such data may certainly not be understood.

An additional factor complicating the evaluation of information stored in data bases is the inevitable depreciation of stored data. Such data may quickly become obsolete as the objects or relations to which they refer may change or no longer exist. Information in a changing world cannot be stored without a significant loss of value. As far as computerised data bases are concerned, the importance of data management and updating problems varies greatly with the degree of stability of the objects and relations to which the stored data refer. Also, an assessment would have to be made in each case of the cost-advantage of collecting certain classes of data every time they are needed instead of storing them.

Charging the user

The problem of economic evaluation is frequently confused with the quite separate problem of charging the user for the service of a data processing centre. This service may consist of routine processing, or the provision of information for other purposes. The fees charged may be based on costs actually incurred, but other aspects may also be taken into consideration.

It must be stressed that there is an important difference between charging external users, or just another part of the same organisation, or government. External prices serve both an income and an allocation function, whereas internal prices have only the latter *. Internal charging is employed in Sweden, Denmark and Finland, and will also be employed in Norway. In Germany government service centres generally do not charge the user.

The charging of external users is of less importance in government-owned or sponsored data centres, although these may in some cases give service to the private sector as well. Rather, it occurs in the sector of economic statistics where the related problems have been given some attention from the point of view of charging the user of statistical data. In the case of charging not for data processing service but for information it is rather difficult to take the cost incurred in generating the data as a base for charging, as it cannot be easily foreseen how often the same data will be sold. Statistical information may not be treated as ordinary merchandise. It can be sold an indefinite number of times while still remaining with the seller. The basis for charging, therefore, cannot be purely commercial. Guaranteeing equal access to such data may be an important factor, as a high price might favour big enterprises at the expense of smaller ones.

Internal pricing may be employed as a method of ensuring efficiency or attaining other related goals. Generally, internal charging mecha-

* Sharpe (04), p. 433.

nisms are closely related to costs effectively incurred by a service bureau type of government institution. However, the costs taken into account may range from marginal costs only to a complete apportionment of every overhead cost *. The costs to be taken as a basis depend on the purpose for which data are to be used. Service bureau centres could be permitted to earn an internal "profit", so that they can be judged, as an overall measure of efficiency, against outside service centres, even if in practice public administration departments are not allowed to work with outside service bureaux **.

The translation from costs into effective charges may also involve other factors following principles of political or organisational rationality . Preferential treatment may be granted where a high payoff in terms of administrative efficiency is likely.

The supposed effects of charging inside users are in principle the same as those expected from economic evaluation and cost control. Administrators should become more aware of computer costs and seriously consider what it is really worth to get a certain piece of information, or to get it more rapidly. General efficiency in public administration should thus increase.

However, certain negative aspects of charging may also be observed. The attention will often be confined to data processing costs, and other administrative costs occurring in the user agency before and after data processing may be overlooked.

In addition, internal charging shares with economic evaluation the problems which are mentioned below.

Economic versus organisational rationality

It is commonly believed that economic evaluations are an important condition for the successful development of data processing systems, and thus also of large integrated data bases, and for overall efficiency in the performance of public administration in its daily work with such integrated data bases. Such a view may be correct from many aspects. However, it presents the danger of assuming a convergence of efficiency and economy in a public administration environment, in the sense of taking economically rational behaviour as the criterion for efficiency in public administration.

Before tackling this problem, some attention has to be given to the concept of efficiency. Efficiency as it is understood here is not confined to data processing in a public administration environment, but to the various functional parts of the work of public administration seen as a whole. Overall organisational efficiency in the sense understood here

* Morris (02), p. 19.
** G.H.C. Ardron, "Tangible Aspects of Economic Evaluation" in (03), p. 29; Sharpe (04), p. 433.

has little to do with efficient computing. It may be that a high degree of organisational efficiency is reached with a rather bad computer performance, provided that the functional steps of the working procedure outside the computer are well organised. The computerised part of an administrative process, the "application" seen from the computer specialist's view, is only part of the whole process. In such a process, manual performance and computer performance of the same steps can be regarded as interchangeable, and they may be compared with each other.

Organisational efficiency is simply "good" administrative behaviour that is optimising the attainment of the goals of an administrative action*. It is the result of rational behaviour within an organisation realistically adapted to its end. It is synonymous with organisational rationality.

Organisational efficiency or rationality is neutral as to the various goals to be attained by an organisation. One may speak of efficiency in the context of efficient protection of personal privacy, or efficient law enforcement, etc. Public administration as a rule has to optimise several goals at the same time. These goals are not quantifiable as are the main goals of private enterprise. Very often, they are even not spelled out. This makes for considerable difficulties in evaluating the organisational efficiency of administrative processes. It may well be that the average degree of efficiency of public administration is far higher than is often stated in public discussions, but this efficiency is directed towards goals the attainment of which cannot be measured easily.

The question now is whether the different forms of economic evaluation are a practicable way to ensure administrative efficiency when integrated data bases are involved. The same may be asked with regard to charging policies aiming at making agencies which use data processing services more conscious of the economic implications of their decisions.

It is contended here that economic evaluations are an imperfect tool for the measurement of organisational efficiency in public administration. The rationality of public administration cannot be reduced to economic rationality. Economic evaluations are procedures for evaluating alternatives with regard to only a single aim: making profits and/or avoiding costs. They do not take into account any other potential or actual aims. Therefore the complex goal structure of public administration does not enter into economic considerations. Rational administrative behaviour - trying to optimise different goals - must be guided by many different criteria, of which avoiding expense may be one which carries more or less weight, according to circumstances. In many cases it may be permissible to take the cheapest way only if, by two or more ways which imply different costs, the remaining goals of an administrative action can be optimised to the same extent.

* Herbert A. Simon (11), p. 36.

Even this general warning needs to be strengthened with regard to organisational integration and integrated data processing. Besides the complexity of the goal structure of public administration, a second important factor is brought to bear on the usefulness of economic evaluation for assessing the efficiency of integrated data processing systems and the organisational integration which they may entail. As this integration potential is at present hidden by the organisational structure of public administration, cut into sharply separated units following the need for division of labour, the rationality of economic evaluations is frequently confined to these departments, at least if there is no central co-ordinating agency in charge of planning and promoting integrated systems.

If an economic evaluation is limited to those agencies which are involved in the first step of implementing an integrated system, solutions with less potential for future integration may be preferred, as a more limited system would be more economical from a short-term viewpoint. As a result, benefits that may occur later and fall into the jurisdiction of agencies not engaged in the implementation process may be neglected. It may be asked whether in such cases a more expensive way of automation should not be preferred because of higher long-term payoffs.

The limitation of economic evaluation just indicated is not due, however, to its inherent capacity but to its limitation by organisational factors that may be overcome by appropriate measures, such as the creation of special co-ordinating agencies or task forces.

But even with such organisational provisions, the main shortcomings of the present methods of economic evaluation would not disappear. These methods may be of some use in assessing the rentability of well-defined services, e.g. in the field of public transport. The usual method of making an evaluation in monetary terms and then listing the intangible benefits and external costs gives disproportionate results when a wide range of such unquantifiable factors has to be considered. The intangible effects of integrated data processing systems may occur in a wide range of sectors, and they may often be hidden by other factors.

In the usual methods of economic evaluation economic considerations are the overriding criterion, giving undue relevance to one goal of administrative action among others, namely to perform its tasks in the cheapest way. This leads to considering the list of non-quantifiable factors only in cases where no substantial higher costs or savings are predicted. In the case of integrated systems, the important potential that may even lead to quantifiable savings in the longer term is neglected if future steps of integration likely to occur in the years to come are not yet being taken into account.

It may therefore be proposed that economic evaluations be taken into account as one factor among others, in a list in which further factors such as external costs (citizens waiting in a queue) or non-quantified benefits would appear. These different factors could be given

some weight in a political decision process. Optimum constellations as to the optimisation of different goals could then be defined. Experts could indicate the costs needed for several alternatives defined politically beforehand. They could, for example, indicate the costs of improving a service in different ways, e.g. by delivering a certificate within four days instead of three weeks, or within a few seconds in a terminal-equipped office. If such an improvement then seems too expensive, this decision process could be repeated until a satisfactory solution is found.

Such an approach would stress the political dimension of efficiency or rationality in public administration. There may of course be the danger of highly irrational decisions. A nation may be willing to pay for a slight increase in law enforcement efficiency by enormous investments in a computerised law enforcement information network.

But the approach proposed here is not in contradiction with the policy of giving a certain predominance to rentability considerations, even on a short-term basis. We must be realistic enough to see that perfect rationality or organisational efficiency in public administration cannot be reached with our present problem-solving capacities. It may therefore be highly beneficial to base political options on financial considerations, if this does not lead to hiding the underlying political responsibility for the functioning of government and administration.

This relative emphasis on economic questions may be an important condition for success, if the shortcomings of purely economic evaluations in a public administration environment are borne in mind. Such an emphasis, however, does not mean that all current practices, aiming at saving money in any case are adequate. Badly-designed budget cuts may in some cases compromise the good effect of expenditures already made. Strong financial pressure may force agencies to rent equipment instead of buying it, which in the long run may become more expensive *.

There are strong indications that in the immediate future short-term payoff consideration and rather tight financial constraints should continue to play the role they are playing in Sweden. Such a situation seems to be an important condition for the success in building up large centralised data bases and getting them to work efficiently. They induce a step-by-step approach which may be very beneficial if the wider integration perspective is present in the minds of the designers of the systems. The potential of rationality flowing from the integration prospect is still widely unknown as are its potential dangers and shortcomings.

An enormous amount of research will be needed before a higher degree of rationality than at present is available, which would permit the gains in rationality and organisational efficiency in public administration to be weighed and counterbalanced against negative factors leading to less optimal attainment of some still unidentified goals, and

* Raphaël Hadas-Lebel (FR03), p. IV-17.

possible dangers for individuals as for society as a whole. Some indications as to the direction into which such research could go are given in the following part of this report.

However, policy decisions generally cannot be postponed, therefore criteria of limited rationality must be identified now. Among them, economic criteria will go on playing a dominant role for some time to come.

Part Four

IMPACT OF ADVANCED AUTOMATION ON THE STRUCTURE AND FUNCTIONS OF PUBLIC ADMINISTRATION

4. 1. EXPECTATIONS AND REALITY

As the succinct country reviews in Part Two have shown, most of the random-access integrated data bases for operative purposes in public administration are still in a fairly early stage of development. It might be doubted, therefore, whether it is at all appropriate to start dealing with their impact on the structure and functions of public administration . Yet the purpose of an assessment of such impacts is not merely academic. It lies in providing facts and guidelines for policy-making concerning further introduction of computer technology into an area which promises to be one of its major application fields.

Steps are being made in the countries reviewed towards a new qualitative stage of information technology application, characterised by large random-access data bases, remote inquiry and updating facilities and corresponding information standardization effects (introduction of person numbers). Therefore it does not appear to be too early to look for clarification of the major policy issues in this field. If the consequences of decisions to introduce large integrated data bases into public administration can be evaluated, better judgements may be made as to the desirability of pursuing to introduce them.

Available technologies are only one factor to be taken into account in such policy considerations. Others are economic possibilities and constraints, as discussed above, and possible consequences of certain uses of these technologies in the structure and function of public administration, its place in a given political system, the balance of political power and the privacy of the individual.

However, the necessity for discussing such consequences of integrated data bases should not mean concealing certain important difficulties that make such a discussion highly hypothetical, and not yet of great use.

Although many tentative conclusions about the impact of advanced automation have already been drawn, almost no empirical studies are available to verify or reject the fears and hopes to which the "Government information systems" or the "Data Bank" projects have given rise. A notable exception is a study carried out in the United States on behalf of the National Academy of Sciences under the direction of Alan Westin*.

The lack of any solid body of knowledge in this field is not surprising. The impact of automation in administrative operative routine tasks, mainly where payroll, accounting, social security and taxation are concerned, was generally slight. It led to minor changes in administrative procedures, notably in management and control. An important impact can be expected only with the extension of integration data base systems. As developments in this field have either failed or are still only just beginning, it is understandable that no major research work in this area could have been carried out until now.

It may be worthwhile, therefore, to contrast the consequences of the automation of routine tasks in public administration with those expected from the development of large data bases.

The problems generated by routine automation were generally of a legal nature, except possibly for significant impacts on financial review and audit methods. Lengthy discussions have gone on in several countries as to whether administrative decisions in individual cases (the "administrative act") may finally be "made" by a computer programmed by human beings; who would be held responsible for that decision, and would the absence of a signature not invalidate the administrative act**. The programmation of a routine task often led to the recognition that public administration follows standardized rules, even if these were not formally stated. In the particular case of France this gave rise to a legal problem, as the "pouvoir réglementaire" belongs in principle to the Prime Minister only and not to the executing agency ***.

Of some importance, past and present, is the impact of routine automation on existing legislation in many fields. Social security laws may require double computation on different bases, and the choice of the higher amount in the case of a pension to be paid. In Germany this has led to determined requests that legislation should be adapted to automation (Automationsgerechte Gesetzgebung), and contain provisions which are not too difficult to programme or need less machine time for execution****. This effort is frequently confused with another effort at simplification, namely the standardization of the meaning of legislative terms, which is of more direct relevance to integrated data processing.

Possibly the chief tangible impact on administrative structures caused by the automation of routine tasks can be observed in the field

* Westin (AA02) and (AA03).

** Luhmann (AA16), pp. 40ff; Hadas-Lebel (FR04), pp. III-1ff.

*** Hadas-Lebel (FR04), pp. III-7ff.

**** See, for example, Hermann Spillecke, Probleme automations gerechter Gesetzgebung, in: IBM Nachrichten No. 208, October 1971, pp. 865-867.

of financial audit. New forms of audit were developed, aimed not only at accounting for expenses, but also at controlling organisational efficiency *. This has already led to controls being carried out in systems development and programming. At an early stage auditors are being involved to give advice on cost efficiency questions. Formal procedures have been instituted, for example, in Germany, for testing and releasing computer programmes for administrative purposes **.

Anticipatory controls play a more important part in preventing errors or inefficiency than the control of individual results of administrative action, which is therefore losing its importance as far as automated tasks are concerned. Audits on the exact execution of programmes can in principle be performed by the computer itself.

By contrast to these rather modest impacts, a first glance at the already voluminous background literature dealing with integrated data bases, information systems or the like, would give the impression of very strong impact. All kinds of expectations are expressed with regard to the new technology. The structure of public administration should be completely modified, hierarchy should become less important, the mentality of public officials should change, institutional separations would be broken down, permitting a horizontal approach to important political and social problems. Much of this reflects current public thinking about and discontent with the present form of public administration, as expressed in an OECD report ***:

"Since problems were for so long deemed to be immutable, functions already assumed became more important than aims. Thus the attainment of major national goals, such as the elimination of illiteracy or the improvement of agricultural yields, called for the development of the relevant government functions, such as education and agricultural policy. In the sequel, within each of these functions, new goals were inferred from extrapolations of goals already achieved; the functions defined the problems to be met, and reassessment of the problems at hand did not lead to the redefinition of the function.

"The rigidity, fragmentation, and institutional competitiveness of bureaucratic practices are obviously both causes and consequences of this state of affairs. Bureaucratic development is partly a result of the vagueness of aims pursued. The determination of new aims is often not sufficient, however, to overcome these weaknesses, which also stem from the inclination of bureaucracies to resist innovation. For these reasons, contemporary societies are called upon to challenge certain forms of organisation that can no longer render the services they require".

Although it may be desirable to change such a situation, this does not mean that it should be assumed, without further inquiry, that integrated data bases provide the means for doing so. There is at

* Automation und Rechnungsprüfung (GE14), Hadas-Lebel (FR04), pp. III-10ff; LAMSAC, Computers and Audit (UK03).

** Automation und rechnungsprüfeng (GE14).

*** Science, Growth and Society (06), p. 59f.

present almost no evidence for the incidence of such changes as a result of integrated data processing development.

Neither does it mean that some of the anticipated impacts are likely to occur at all. Continuing attention should be devoted to this problem, as there are strong indications that, at least in many European countries, the piecemeal development of large integrated data bases for operative administrative agencies is likely to be successful. This might lead to a situation where important consequences for public administration and society as a whole might arise. New assessments of the situation and new efforts to introduce the results into policy discussions will therefore be continuously required during the coming years.

Only a few impacts are dealt with here. It still seems almost impossible to evaluate the impact of advanced automation on political decision-making, on processes of nation-wide, regional and urban planning. The following pages are therefore restricted to discussing actual or at least foreseeable consequences for the centralisation issue, for the question of distribution of powers (between local and central government, and between Parliament and Government), and for the quality of services rendered by public administration. Finally, some further tentative conclusions about social consequences of a more general nature will be made.

4.2. CENTRALISATION AND DECENTRALISATION IN PUBLIC ADMINISTRATION

It is often stated that one of the most important impacts of integrated data bases might be in connection with the issue: further centralisation or decentralisation in public administration. The following quotation from the brief of the Swedish Committee on Integration and Control of Data Banks is representative in discussing this:

"...fears have also often been expressed concerning the centralisation of information which ADP-development should bring about. Above all, these fears have been related to shifts of power within organisations, including the State, local authorities and enterprises, where ADP-techniques should lead to more centralised decision-making. It is true that until now ADP has led towards a centralisation of information handling. But the new techniques of terminal-based information systems make decentralisation possible, as may be desirable under several aspects...

"One question...is whether information systems shall be based on central or regional data banks. Development of big information systems in the State sector hitherto are clearly directed towards central data banks with terminals. However, the available techniques also open up possibilities to build up information systems based on regional data banks and regionally located computers..." *

* Samordning och kontroll av databanker (SW04), pp. 10f. (Translated from Swedish).

It is often alleged that there is an inherent trend in information technology to promote centralisation in public administration. Sometimes, too, it is stated that this technology makes decentralisation possible. In this connection hopes are expressed that public administration may be more prepared to look at important social outcomes not from a narrow jurisdictional viewpoint but by considering all the relevant aspects of a problem.

It seems useful, for the purpose of this discussion, to start from a clear understanding of the concepts: centralisation and decentralisation. These terms may refer to several important issues:

- centralisation of computer equipment procurement;
- centralisation of computer operations;
- centralisation of the programming function;
- centralisation of systems analysis and design, implementation;
- (physical) centralisation of data storage;
- centralisation of the institutional organisation of public administration;
- centralisation of the functional organisation of public administration.

In this report, the focus is on the centralisation and decentralisation of functional and institutional organisation of public administration and related problems. The questions of the centralisation of the various data processing functions have been dealt with at length in another OECD report *. Neglect of these issues here does not mean, however, that they have no bearing on overall administrative organisation.

Even with such a limitation important problems still subsist.

In some countries, decentralisation often means the physical displacement of offices or computer installations to a location some hundred kilometres away from the capital. This may have an important impact on economic life, but it does not constitute in itself an act of administrative decentralisation.

The term "decentralisation" is often loaded with fairly strong political connotation, namely the idea of strengthening local and regional government in order to counterbalance the power of central government. Sometimes, a terminological distinction is made between (de-) centralisation and (de-) concentration. Deconcentration refers simply to the spreading of offices over the country or the splitting up of a unit into branches, the whole still constituting an administrative unit in the legal sense. The term decentralisation is then restricted to the creation of autonomous administrative units outside the main unit.

* Thomas (AA15), pp. 49ff; see also Kordes (AA06) and François (AA13), pp. 52ff.

Another idea often alleged to be in support of decentralisation (and also of deconcentration) is the desire to bring public services and the public in closer contact with one another and administrative decision-making as close as possible to its objects. A maxim may be formulated: responsibility for administrative decision-making should be on the lowest level where the necessary skills, competence and information are available and can reasonably be brought together *.

On the other hand centralisation is necessary in order to secure minimum standardization and co-ordination of the exercising of public power and the rendering of services. It should also be stressed that centralisation and decentralisation hardly ever occur in a pure form. In most cases, there may be only partial centralisation or decentralisation. Even in a single decision-making process, more centralisation could occur with regard to one aspect, and simultaneously more decentralisation with regard to another.

There may be different ways of arriving at a greater or lesser degree of decentralisation or centralisation. One way may be to transfer actual decision-making power from a subordinate to his hierarchical superior. Another may be the use of general standards or rules which restrict part or all of the decision-making power of the official. In this last method rigid rules and standards emanating from a central authority may lead to a state of affairs where the formal autonomy of separate units on the local or regional level does not give an adequate idea of the different forms of factual dependence occurring simultaneously. In such a way, federal or state standardization efforts may have a centralising effect, at the expense of government units at a lower level.

The significance of integrated data bases for the centralisation issue lies in the fact that they offer a unique occasion to compensate the effects of the division of labour in bureaucratic organisation. In a large measure, the structure of such organisations reflects information handling constraints. Because of limited human capacity for storing and processing information, sophisticated organisational structures were devised permitting complex organisations to work. This led to tasks being split up into several procedures carried out by different offices, to the same information being collected several times by different offices, and to difficulties in updating existing registers.

The consequences of integrated data bases may be identified mainly in the functional organisation of public administration, i.e. in its procedures, the ways in which decisions are made and executed. The related institutional organisation may also change as the functional organisation is improved by integrated data processing. But this is not necessarily so, and, as will be indicated below, almost no changes within the institutional organisation can be registered at present.

When the impact of integrated data bases on the functional organisation of public administration is being discussed, it must be borne in

* Simon (11), p. 234ff ; also Kordes (AA06).

mind that the present forms of division of labour, of isolation of units unaware of what the neighbour unit is doing, and of patterns of intra-organisational and inter-organisational relations may be seen not only as obstacles to the better use of administrative resources, but also as a form of separation and balance of power within public administration. Some of the dangers inherent in changing the present state of factual and mostly unregulated division of power within public administration are briefly discussed below*.

Functional centralisation

The main development brought about by integrated data bases may be called "functional centralisation". This means the linkage or consolidation of working procedures or parts of such procedures which are being performed by separate parts of an organisation. These parts may be arranged following their functional connection, without regard to the institutional organisation. This may lead to taking away a (part of a) procedure, from an institutional part of an organisation, but does not necessarily lead to institutional consolidation of departments or shifts in the responsibility for the final "product"**. In such a way, the function of collecting and storing information for the execution of multiple tasks of public administration may be performed centrally. Integrated data bases as the key element of advanced automation permit the centralisation of the information function.

Such a functional centralisation, or functional organisational integration, can already be observed in some fields due to mere routine automation. It can be assumed that in the field of accounting and financial review there have been many developments in this sense. However, to identify them exactly presupposes a thorough analysis of the functional organisation both before and after the introduction of computer technology. It has already been pointed out that such investigations have often not been carried out as they might have been.

Therefore, only few indications can be given here. Good examples of a possible functional centralisation of large parts of the information storage function for several departments or agencies can be found in the sectors of law enforcement and car registration. The Swedish Register of Persons and Offences (PBR) provides a common data base for several groups of agencies concerned with administering criminal justice. Despite their organisational autonomy, these have to support what is in fact a continuous process ***. In Denmark and Sweden, the car registration systems support a wide variety of administrative procedures, by supplying the information required in each of these procedures, without changing the final responsibilities of any.

* See below Section 4.6, pp. 108-110.
** Ostermann (AA07) pp. 140ff.
*** See NYSIIS (AA23), p. 11.

Centralisation of control

Still with regard to functional organisation, a second kind of centralisation can be observed, which might be called "centralisation of control". This means that with the support of integrated data bases the upper levels of authority are in a better position to control the work of the officials in their own unit or in decentralised units under their supervision. It is believed that such centralisation of control permits institutional and physical decentralisation of administrative units*. If integrated data bases facilitate control and supervision by central authorities over deconcentrated units or decentralised authorities, the control authorities should be more strongly motivated to delegate powers of decision , as the use of such power can be closely monitored.

Such a combination of centralisation of control and institutional decentralisation may be of outstanding importance in centralised political systems where the central authority, in order to ensure uniform standards of services and the exercise of power, is not prepared to abandon its position, but at the same time would like to bring public administration into closer contact with the environment in which it acts. " Because of the great flexibility information technology provides for the circulation of information, it could allow for deconcentration and decentralisation, at the same time avoiding the risk of disorderly dispersion. Thanks to information technology one could in fact give more freedom to the peripheral units, while keeping the centre better informed"** .

Beyond doubt, such an evolution which, until now, has hardly been felt, would strongly enhance the quality of services rendered by public administration. Whether it can also have beneficial effects on other goals which decentralisation might help to attain, remains to be seen however . There is some doubt as to whether such a centrally controlled apparent decentralisation can really promote citizens' participation in public affairs or constitute a countervailing power to the central government, as is often expected.

In connection with the kind of decentralisation mentioned the question is sometimes one of "regionalising" integrated data bases. As far as this means the physical dispersion of data storage, it does not make any difference to a centralised integrated data base, as long as the same central authorities and decentralised office have access to the same stored data. The main factors influencing the decision as to the physical location of data bases are not of an organisational nature but concern the economies that may eventually be realised by decentralisation if data transmission costs are too high and inquiries into registers or updating come almost exclusively from the region where the data base is located physically.

*Hadas-Lebel (FR04), p. IV-4.
**Hadas-Lebel (FR04), p. IV-4 (translated from French).

Institutional organisation

Few impacts on the institutional organisation of public administration can be identified as yet. Some changes have occurred, but these are not drastic ones. Only in minor cases do formerly separate branches of administrative units appear to have been consolidated.

An interesting institutional rearrangement within one organisation took place in the Swedish Central Bureau of Statistics in 1971. Until then, subject-matter-oriented departments were responsible for all work to be done for delimited statistical matters, from collecting basic data to publishing the final results. By the reorganisation, the number of these departments has been reduced to three. Their task has been limited to administrating the "information capital" constituted by the stored primary or aggregated population data; land data, and enterprise data respectively. Such data is drawn from public registers for operative purposes, or collected otherwise and stored in three major data bases. Function-oriented departments are in charge of planning and co-operation, of data processing operations including data base maintenance, etc. This reorganisation is the result of implementing a statistical file system in which individual data are not lost once under processing, but continue to serve as a basis for a wide variety of statistical computations *.

In other sectors, the occurrence of the most significant anticipation, namely a functionalisation of the institutional organisation of public administration, cannot yet be verified. Nowhere do the patterns of departmentalisation seem to have changed. The growing awareness of administrative structures has so far led only to efforts aiming at crossing institutional borders by data exchange, sharing of machine-stored data, and possibly to closer co-operation and better co-ordination. These institutional borders are generally not being questioned, and developments generally remain within the limits they impose.

Such a situation is not surprising when compared to a private business environment, where not much impact can be identified either **. As far as public administration is concerned, further constraints may arise from the difficulty of changing organisational patterns established by laws which can be amended only after lengthy procedures.

When considering a possible impact in connection with attempts to introduce reforms in public administration it should be remembered that these attempts at present mainly concern institutional questions, especially the optimum territorial size of the jurisdiction of administrative units like municipalities, counties, regions or Länder.

The more important questions of the functional organisation of public administration are frequently left out altogether in efforts aiming

* See Ohlsson (SW08) and Nordbotten (AA21).
** Whisler (05).

at reforms in public administration. As the impact of integrated data processing would be felt, if at all, first on functional organisation, it is understandable that such reform efforts seldom take into account the requirements or the potential of integrated data processing. In countries such as Germany, where it is commonly felt that the jurisdiction of local authorities is too limited, these are generally consolidated, but not with the view of attaining administrative efficiency by making optimum use of advanced forms of automation. In exactly the same way, highly centralised countries such as Belgium, France and Sweden are considering the regionalisation of administrative structures, but the size and structure of regions created or to be created does not seem to be influenced by considerations of the potential of advanced automation.

4.3. SHIFTS IN POWER AMONG LEVELS OF GOVERNMENT

It is often envisaged that advanced automation will lead to certain shifts in power by bringing about economies of scale, favouring bigger units, and obliging the smaller ones to co-operate. Two kinds of relations may be pinpointed where such shifts might occur. There may be "vertical" shifts from local government to central government, or, for federal political systems, from State (Land) to federal government. Power might be also shifted "horizontally", from the legislative to the executive, from parliament to the government, only the latter having full access to large integrated data bases and being able to make full use of them.

In some countries, population registers were first built up not by the central government but by the local authorities. This is true of the Netherlands, parts of Germany and, before the introduction of the Central Population Register, of Denmark. In the three countries mentioned there is a fairly high degree of co-operation among local authorities that was reached before administrative tasks were automated. The municipalities in these countries carry out many if not most administrative tasks that in other more "centralised" countries may devolve upon the State. The difference may be seen in the fact that when automation made co-operation necessary at local level, this co-operation developed fairly quickly in the three countries mentioned, whereas it still does not seem to be very far advanced in such countries as France or even Belgium, where the amount of administrative tasks delegated to the municipalities is also fairly high.

Among heads of local government and associations of local authorities in the three countries first mentioned there is a strong feeling that appropriate co-operation at local level permits even the smallest local communities to make full use of available technologies through joint municipal data centres and common systems development. Moreover, it is felt that the standardization necessary to implement advanced forms

of automation efficiently could in principle be reached by co-operation and mutual agreements at local level.

However, at least in Germany, a trend may be observed towards a stronger involvement of land administration through the creation of joint land/municipal data centres and the planning of common land/municipal information systems. The political structure of Germany is characterised by a high degree of interdependence of local, Land and federal levels which does not exist to the same extent on other federal political systems. In many fields, there are not only associations for co-operation at the same level, but also for co-operation among different levels, e.g. when the Federal Government is preparing to lay down rules for an activity carried out by the Länder

This sort of tradition has an important bearing on the organisational form of the joint Land/municipal data centres described above. A certain danger might be seen in joint commissions in charge of promoting advanced automation, or in joint data centres where the land and associations of local authorities officially carry the same weight. In such a form of co-operation, a certain preponderance on the part of the Land might develop at the expense of local government. Municipalities grouped into associations might have much more difficulty in clarifying their views and arriving at common agreement than the branches of a Land administration.

A certain shift of power from the local to the Land level is related to provisions in Land laws on data processing according to which the Land may decree that local authorities should apply standard programmes or should collect and supply the Land with data in a standardized form*. It may be highly desirable that such standardization be introduced, but the impact of such a development on local government should not be overlooked, even if it is provided in these laws that joint Land/municipal commissions shall participate in defining these standards.

4.4. POWER SHIFTS FROM PARLIAMENT TOWARDS GOVERNMENT

Discussions of the impact of automation on government and administration often centre round the fear that the executive might gain increased power at the expense of the legislative.

However, as far as the influence of information technology, and especially integrated data processing, is at stake several factors make this discussion an extremely hypothetical one. Too many aspects

* See for example "Gesetz über die Datenzentrale Baden-Württemberg vom 17.11.1970" (Gesetzblatt Baden-Württemberg, p. 492) section 12, and "Gesetz über die Organisation der elektronischen Datenverarbeitung im Freistaat Bayern (EDVG) vom 12.10.1970" (Bayerisches Gesetz - und Verordnungsblatt, p. 457), section 12. According to the last mentioned law, the association of municipalities must agree to such regulations.

independent of the development of integrated data bases are in fact involved. More important than new technologies and their possible applications seems to be the general political situation of parliament in each particular country concerned by this discussion. Differing regulations governing public access to government records and the current way of handling State secrets may also play an important role. Furthermore, skills required to exploit the information contained in a data base may be easier to find in a government environment than in parliaments.

Theoretically, the easier access of government to administrative data bases may constitue a supplementary advantage to the executive if no countervailing provisions are made. But election polls, behavioural research and the development of "social indicators" could be of far greater importance for the advent of the perfect "governing machine" than administrative data bases. Only insofar as these activities may contribute to such activities might they have some bearing on this issue. In any case, policy research on this problem should start from these activities, and not from the relatively modest tool that integrated data bases may provide.

Although there is as yet no evidence for shifts in power from the legislative to the executive caused by integrated data bases, efforts are already being made to find remedies. According to Section 10, Paragraph 2 of the Data Protection Act of the Land of Hesse, Germany*;

> "The data protection commissioner shall observe the effects of automatic data processing on the operation and powers of decision of the establishments referred to in Section 1 and note whether they lead to any displacement in the distribution of powers among the Land's constitutional bodies, among local administrations and between Land and local administrations. He shall be entitled to initiate any measures he thinks fit to prevent such effects".

There has also been a proposal to establish parliament data bases parallel to the administrative data bases ** . However, this does not seem very realistic, as the cost of such data bases would probably far exceed the sum that many countries are willing to spend on the work of their parliaments.

* Datenschutzgesetz vom 7.10.1970 Gesetz-und Verordnungsblatt Hessen I, Nr. 41. For an unofficial English translation, see (08), p. 50.

** Steinmüller (09) p. 67.

4.5. QUALITY OF SERVICE

It is often expected that advanced automation would significantly enhance the quality of services provided by public administration. However, as has been shown, the commitment to short-term rationalisation effects often hampers efforts to achieve better quality of service. There is still a tendency to rationalise in view of manpower savings which are often doubtful, while possibly trying to keep the quality of service at the same level as before. Sometimes the quality of service may be lowered as, possibly unintentionally, automation is taken as a reason for asking taxpayers or welfare applicants to fill in still longer forms more carefully than before. In such a way, considerable amounts of administrative work are shifted towards the client applying for a service. Seen from the angle of public administration, this may be less expensive, but it is certainly as expensive, in terms of social costs incurred by society as a whole, as the system previously in use.

However, some examples of significantly better service may already be found. There are strong indications that, with the relief of the isolated automation of administrative routine tasks by integrated data processing, there will be a change of attitude.

Most of the central data bases in Sweden will no doubt lead to much shorter response times in handling inquiries from the public or carrying out operations such as car registration or land registration. In these cases, the time necessary for the procedure would be reduced from several weeks, as at present, to a maximum of few days.

An important feature of the Swedish car registration system will be that nobody applying for a car licence will have to go personally to the car registration office. All formalities can be handled by mail. Such an effort avoiding physical displacement seems to be fairly unique. It can be assumed that an important amount of waiting time can be saved in this way

Still another important service improvement is better information for the citizen as to his rights and duties, welfare eligibility, amounts of old-age pension due, tax liability, etc. This can be achieved, in principle, in two ways. One would be to deliver centrally, at regular intervals, printouts of calculations of old-age pension rights or similar matters and mail them to the individual concerned * . The other would be to make full use of available remote inquiry facilities to set up new local offices, using very few staff, to bring such an information service to the neighbourhood. The same thing may apply to the delivery of certificates, identity-cards, drivers' licences, etc., which could be issued not by a single regional office such as the French "préfecture", but, for example, by many local offices with terminals installed to print these documents.

* Such a solution is considered in the old-age pension system for employees in Germany. See Winkler (GE15).

No efforts aimed at setting up new local offices have yet been encountered. No new offices to be equipped with terminals have been created. If terminals are to be installed, offices already in existence are chosen. In France, it is planned to issue drivers' licences, identity cards, and other certificates by printer terminals * . This should lead to shorter issuance delays. No projects in the sense of bringing these services closer to the citizen seem to be under consideration so far.

The scarcity of cases reported where better service may be attained should not lead to the assumption that advanced automation has no impact yet in this field. In many cases it may be quite possible that the perspective of implementing a central data base with remote terminals later on prevents an agency from closing down its local offices. It may be doubted whether, for example, in Sweden, some of the local health insurance offices would not be closed if there were no plans to connect them to a centralised system.

Routine automation has sometimes led to the dissolution of local offices. If the people affected are to be served by mail, this could save them time and money. But at the same time it may result in a considerably lower quality service, since no more direct information on welfare eligibility conditions or tax liability, for instance, may be given over the counter. With the perspective of integrated data processing, the trend towards centralisation in the supply of services rendered by public administration may be stopped.

4.6. SOME POSSIBLE SOCIAL CONSEQUENCES

The potential of advanced automation in public administration may be an incentive to look at the impact on other societal functions of public administration than the delivery of services.

In order to discuss the related problems, it should be recalled briefly that the basic impact of integrated data processing on public administration lies in the possibilities which it opens up for common data storage and new forms of data exchange that may cross institutional borders. It must also be recalled that developments towards common data storage and changed patterns of data exchange, and thus towards organisational integration, are to some extent possible without any participation of information technoiogy.

Questions of changing societal functions of public administration seem to have been somewhat neglected in discussions about the consequences of information technology. If they are discussed, it is under legal aspects or in terms of personal privacy.

* Thiébault (FR05).

A somewhat different view might be taken, based on whether data exchange and data sharing which permit institutional borders to be crossed would not lead to disfunctional consequences calling for adequate regulations. Threats to privacy arising from integrated data processing in public administration are closely related to functional centralisation since data may be shared or exchanged, either manually or by machine. This fact permits or leads organisational barriers formerly created by the need for division of labour to be disregarded to a greater extent than before. Threats to privacy do not arise only from inherent qualities of certain kinds of information, but also from the possible use that could be made of such data by different organisations or departments with different goals and different functions, and which are given different chances of exercising power in order to attain their goals. As the State holds the monopoly of legal power and at the same time provides for large sections of the daily needs of its inhabitants, information given in order to obtain a service may be used in quite different contexts. In most cases this may be a mere expediency. In others it would lead to a situation where citizens simply cannot "cheat", for instance by filling in differently State and local income taxation forms. But the claim that there might also be cases where this facility would constitute a real danger cannot be easily dismissed.

The enhanced power which information technology confers on public administration, by permitting maintenance and integration of computerised personal dossiers, can be described as a consequence of the enhanced transparency of citizens to public administration which results from these dossiers. If personal records were fully integrated or exchanged so that all information collected on a certain person by different administrative agencies could be obtained in one place, this person would be highly visible to all branches of public administration, even to branches that may at present be prevented from collecting such amounts of data for their own use. A degree of transparency or visibility of citizens would thus be attained which at present exists only in small rural communities where the mayor himself carries out all administrative tasks and knows almost everything about everybody.

Such a situation would be the result of a breakdown in the sort of protection normally afforded by the separation of powers within public administration, its division into different branches or agencies with little or no knowledge about each other . Without adequate regulations these situations could occur in the future. The protective function of division of labour within public administration vanishes when there is a data base common to all branches, a common "memory" like that of the mayor of a small community.

The important social problem behind the discussion on regulation of integrated data bases and data exchange may be rendered by the futuristic anticipation of the "global village" to which information technologies could reduce the world. But it has a less futuristic aspect if we recall the very old truth that the efficient exercise of power increases with good communication (and transportation) systems. The

citizen of the global village could be much more visible and therefore more easily dominated. The village situation therefore might not only be a situation of reduced privacy but also one of increased domination. If we add that at the same time the human relationships that were the basis of non-privacy in older village communities will probably never be brought back, we may get an approximate notion of the problems our society will have to face.

The prevailing privacy discussions in many countries contain useful starting points for reflections on this issue. Doubts may arise as to whether it is really desirable to have a common identifier such as the person identification number. So far, in continental European government systems, extensive discussions have taken place only in the Netherlands. With regard to experiences under the German occupation 1940-45 the discussion centred more on emergency situations than on dangers that might be introduced into the conditions of normal life. Even if it were decided that the introduction of person identification numbers was desirable or could not be avoided, attention would at least have been drawn to the problem and the way would have been paved towards the design of adequate provisions and regulations to channel the power resulting from the use of new technologies for rationalisation of public administration.

It is outside the scope of this report to elaborate on protective measures in this field. It must be stressed, however, that detailed regulations concerning government data bases and data exchange have to take into account the specific structure and social functions of public administration. The use of information that may be considered confidential may lead to quite different problems and quite different choices according to whether regulations are being drawn up in a public administration environment or in other sectors of society.

Some useful concepts have already been developed in this connection. Among them is the proposal for a new form of division of powers within public administration, by separating the information or data management function from operative functions and committing this function to the charge of organisationally separate centres of the data bank type *. Another proposal aims at the "juridification" of all data flows, data exchanges and data sharing within public administration. These should not take place unless a law or a regulation expressly allows them to**.

It seems, however, that the practical impact of these concepts will be fairly small, unless a more thorough investigation of structure and functions of public administration make it possible to establish, with some realism, the direction in which these concepts should be further elaborated in order to permit their practical implementation.

* Thomas (AA15), pp. 45ff.
** Kamlah (GE18), p. 61.

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